

ROBERT BEIN, WILLIAM FROST & ASSOCIATES

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

**NOTICE TO CONTRACTORS
AND
SPECIAL PROVISIONS**

**FOR CONSTRUCTION ON
STATE HIGHWAY IN**

SAN DIEGO COUNTY AT VARIOUS LOCATIONS

DISTRICT 11

**ROUTE 5, 78, LA COSTA AVENUE PARK AND RIDE,
ROUTE 5/ROUTE 78 PARK AND RIDE, KEARNY MESA MAINTENANCE STATION,
ESCONDIDO MAINTENANCE STATION, CARLSBAD MAINTENANCE STATION**

For use in Connection with Standard Specifications **Dated July, 1995**, Standard Plans **Dated July, 1997**, General Prevailing Wage Rates (Current Version as of Bid Date) and Labor Surcharge and Equipment Rental Rates.

CONTRACT NO. 43A0004A

BUILT

AS--

Bids Open: July 21, 1998

Dated: June 24, 1998

CONTRACT NO. 11-059104, CCO NO. 8

AS-CONSTRUCTED

January 5, 1999



NOTICE REGARDING AS-BUILT SPECIAL PROVISIONS

These As-Built Special Provisions have been prepared in Microsoft Word with the Track Changes mode to facilitate identification of As-Built information. Specifications that have been modified to reflect As-Built conditions are identified with a vertical bar in the Right hand margin. Contract specifications not incorporated during construction appear in Strikeout, while specifications adding during construction appear in Bold Italics. Changes to these specifications were developed by reviewing the Contract Change Orders (CCO) and Addenda; then, where applicable, modifying the specifications as noted in the CCOs.

Please note that these Special Provisions only reflect the As-Built condition of the work performed, and should not necessarily be considered a replacement to the Contract Special Provisions. Although they may be suitable for future similar projects, it is ultimately the responsibility of the Design Engineer to prepare appropriate Special Provisions for each particular contract.

SUMMARY OF CHANGES
AS-BUILT SPECIAL PROVISIONS REVISION
DISTRICT 11 – PROCUREMENT
CONTRACT NUMBER: 43A0004A

Sites: 1 - Kearny Mesa MS, StormFilter; 2 - Escondido MS, Delaware Sand Filter
3- La Costa PR, Austin Sand Filter 4 - I5/SR78 PR, Austin Sand Filter
5 - SR78/Melrose, Bio. Swale 6 - Palomar Air Port Road (Constructed as PS&E)
7 – Carlsbad MS, Bio. Strip & Infiltration Trench

<u>CCO</u>	<u>Description</u>	<u>Affected Location</u>	<u>Needed Change to Specification</u>	<u>Affected Spec. Section No.</u>
<u>CONSTRUCTION CHANGE ORDERS</u>				
<u>1</u>	<u>Over-excavation</u>	<u>1,3,5,7</u>	<u>Change in BMP lump sum bid item payment clause</u>	<u>10-1.40A, 10-1.40B, 10-1.40C, 10-1.40D, 10-1.4E</u>
<u>2</u>	<u>Stainless steel substitution</u>	<u>2</u>	<u>Change in BMP lump sum bid item payment clause</u>	<u>10-1.40C</u>
<u>3</u>	<u>Storm drain extension</u>	<u>3</u>	<u>None - only payable through force account payment methodology</u>	
<u>4</u>	<u>Delete electrical conduit</u>	<u>3</u>	<u>None - elimination of bid item</u>	
<u>5</u>	<u>Revised vault location</u>	<u>4</u>	<u>None - reduction in bid item cost</u>	
<u>6</u>	<u>Additional filter cartridges</u>	<u>1</u>	<u>Change in BMP description of work</u>	<u>10-1.40A</u>
<u>7</u>	<u>Guard posts/wheel stops</u>	<u>2,4</u>	<u>Could have been separate bid item or included in the BMP lump sum bid item</u>	<u>10-1.40C</u>
<u>8</u>	<u>Safety railing/steps</u>	<u>3,4</u>	<u>Could have been separate bid item or included in the BMP lump sum bid item</u>	<u>10-1.40B</u>
<u>9</u>	<u>Sod installation/seed deletion</u>	<u>5,7</u>	<u>Specification for seeding and planting to be deleted. Specification for sod installation should be added and note sod to be furnished "by others" noted.</u>	<u>10-1.40C & 10-1.40D</u>
<u>10</u>	<u>Additional paving</u>	<u>7</u>	<u>None - extension of pay quantity</u>	
<u>11</u>	<u>Plant establishment</u>	<u>N/A</u>	<u>CCO Voided</u>	
<u>12</u>	<u>Storm drain clean - Melrose</u>	<u>5</u>	<u>Could have been separate bid item or included in the BMP lump sum bid item</u>	
<u>13</u>	<u>Electrical conduit replacement</u>		<u>None - unknown utility line</u>	
<u>14</u>	<u>Infiltration trench</u>		<u>None - design change</u>	
<u>15</u>	<u>Site revisions</u>	<u>1</u>	<u>None - design change</u>	
<u>16</u>	<u>Landscaping</u>	<u>4</u>	<u>None - improvements the were restored were constructed after the bid period</u>	
<u>17</u>	<u>Flume modifications</u>	<u>5</u>	<u>None - design change</u>	
<u>18</u>	<u>Claim/Settlement NOPC No. 3</u>	<u>3</u>	<u>None - design change</u>	
<u>18</u>	<u>Claim/Settlement NOPC No. 7</u>	<u>4</u>	<u>None - design change</u>	
<u>18</u>	<u>Claim/Settlement NOPC No. 11</u>	<u>7</u>	<u>None - design change</u>	
<u>18</u>	<u>Claim/Settlement NOPC No. 14</u>	<u>5</u>	<u>None - design change</u>	
<u>18</u>	<u>Claim/Settlement NOPC No. 15</u>	<u>5</u>	<u>None - design change</u>	
<u>18</u>	<u>Claim/Settlement NOPC No. 19</u>	<u>4</u>	<u>None - unknown utility line</u>	
<u>18</u>	<u>Claim/Settlement NOPC No. 20</u>	<u>4</u>	<u>None - unknown utility line</u>	

Sites: 1 - Kearny Mesa MS, StormFilter; 2 - Escondido MS, Delaware Sand Filter
3- La Costa PR, Austin Sand Filter 4 - I5/SR78 PR, Austin Sand Filter
5 - SR78/Melrose, Bio. Swale 6 - Palomar Air Port Road (Constructed as PS&E)
7 – Carlsbad MS, Bio. Strip & Infiltration Trench

<u>CCO</u>	<u>Description</u>	<u>Affected Location</u>	<u>Needed Change to Specification</u>	<u>Affected Spec. Section No.</u>
<u>18</u>	<u>Claim/Settlement NOPC No. 21</u>	<u>4</u>	<u>None - design change</u>	
<u>18</u>	<u>Claim/Settlement NOPC No. 22</u>	<u>4</u>	<u>None - design change</u>	
<u>18</u>	<u>Claim/Settlement NOPC No. 24</u>	<u>4</u>	<u>None - improvements the were restored were constructed after the bid period</u>	
<u>18</u>	<u>Claim/Settlement NOPC No. 28</u>	<u>2</u>	<u>None - unknown condition of underground facility</u>	
<u>18</u>	<u>Claim/Settlement NOPC No. 29</u>	<u>2</u>	<u>None - unknown condition of underground facility</u>	
<u>18</u>	<u>Claim/Settlement NOPC No. 43</u>	<u>4</u>	<u>None - design change</u>	
<u>18</u>	<u>Claim/Settlement NOPC No. 44</u>	<u>4</u>	<u>None - design change</u>	
<u>18</u>	<u>Claim/Settlement NOPC No. 45</u>	<u>4</u>	<u>Portion of CCO No. 7</u>	<u>10-1.40C</u>
<u>19</u>	<u>Aluminum Substitution</u>	<u>3</u>	<u>Change in material specification for BMP</u>	<u>10-1.40C</u>
<u>20</u>	<u>Extra Work Report No. 55 & 56</u>	<u>3</u>	<u>Could have been separate bid item or included in the BMP lump sum bid item</u>	<u>10-1.40B</u>
<u>20</u>	<u>Extra Work Report No. 72</u>	<u>4</u>	<u>None - adjustment of earlier authorized design change</u>	
<u>20</u>	<u>Extra Work Report No. 74</u>	<u>7</u>	<u>None - design change</u>	
<u>20</u>	<u>Extra Work Report No. 77</u>	<u>5</u>	<u>None - field adjustment of installed improvements</u>	
<u>ADDENDA CHANGES</u>				
<u>1</u>	<u>Revision to quantities</u>	<u>1,6</u>	<u>None - addendum item pertained to changes in quantities</u>	
<u>2</u>	<u>Precast pretreatment vault spec.</u>	<u>1</u>	<u>Add Precast pretreatment vault spec.to special provisions</u>	<u>10-1.40G</u>
<u>3</u>	<u>Revised drawings for Site 1 & 6</u>	<u>1, 6</u>	<u>None - addendum item pertained to changes in the design drawings</u>	
<u>4</u>	<u>Changes in WPCP specification</u>	<u>All</u>	<u>Revise implementation date as the defined date of the commencement of the winter season</u>	<u>10-1.02</u>
<u>5</u>	<u>Changes in specifications</u>	<u>All</u>	<u>Add clause to "Relocate Irrigation Systems" bid item testing the systems prior to relocation</u>	<u>10-1.21</u>
<u>6</u>	<u>Changes in specifications</u>	<u>All</u>	<u>Change requirements of clause regarding "Increased or Decreased Quantities"</u>	<u>4-103B</u>
<u>7</u>	<u>Changes in specifications</u>	<u>All</u>	<u>Replace "Existing Highway Planting" section</u>	<u>10.2.0</u>
<u>8</u>	<u>Changes in specifications</u>	<u>All</u>	<u>Add subsection reading "Check and Test Existing Irrigation Facilities"</u>	<u>10-2.02C</u>

SUMMARY OF CHANGES
AS-BUILT SPECIAL PROVISIONS REVISION
DISTRICT 11
CALTRANS CONTRACT NUMBER: 11-059104, CCO No. 8

<u>11-059104, CCO No. 8 (Special Provisions for Contract 43A0004A-Palomar)</u>				
<u>Site: 1 – Palomar Airport Road</u>				
<u>CCO</u>	<u>Description</u>	<u>Affected Location</u>	<u>Needed Change to Specification</u>	<u>Affected Spec. Section No.</u>
<u>8</u>	<u>Additional Drainage Swale (adds Palomar to the existing contract)</u>	<u>1</u>	<u>None – all construction done per the 11-059104 specifications</u>	<u>None</u>
<u>8-01S</u>	<u>Modify Landscaping and Irrigation</u>	<u>1</u>	<u>None</u>	<u>None</u>
<u>8-02S</u>	<u>Additional Funding</u>	<u>1</u>	<u>None</u>	<u>None</u>
<u>8-03S</u>	<u>Additional Days for Constructing the Bio Filter as part of the Water Quality Program</u>	<u>1</u>	<u>None</u>	<u>None</u>
<u>8-04S</u>	<u>Increase Highway Planting and Irrigation</u>	<u>1</u>	<u>None</u>	<u>None</u>
<u>8-05S</u>	<u>Additional Funds</u>	<u>1</u>	<u>None</u>	<u>None</u>
<u>Note: This project was originally to be constructed as a Procurement Project and specifications were prepared for that process. However, this project was constructed as a change order to an on-going (non-BMP) PS&E construction contract using the Special Provisions for that contract. It is anticipated that if this project were constructed, as planned, as part of a set of Procurement BMP projects, it would be constructed using the Procurement Specs for Contract 43A0004A. No changes were required to the 43A0004A specifications for this project site.</u>				

IMPORTANT SPECIAL NOTICES

- Attention is directed to Section 5-1.13, "Year 2000 Compliance," of the Special Provisions.
- Attention is directed to "Specifications and Plans" of the Special Provisions. The following Special Provisions are for use in connection with Standard Specifications DATED JULY, 1995 and Standard Plans DATED JULY, 1997.
- Attention is directed to Section 3-1.01, "General," of the Special Provisions. The contract is to be executed by the successful bidder and returned with the contract bonds within **4** days, not including Saturdays, Sundays and legal holidays, after the bidder has received notice that the contract has been awarded.
- Attention is directed to Section 4, "Beginning of Work, Time of Completion and Liquidated Damages, " of the Special Provisions. The Contractor is to begin work within **2** days, not including Saturdays, Sundays and legal holidays, after receiving notice that the contract has been approved.

The special provisions contained herein have been prepared by or under the direction of the following Registered Persons.

CIVIL

REGISTERED CIVIL ENGINEER

DRAINAGE

REGISTERED CIVIL ENGINEER

ELECTRICAL

REGISTERED ELECTRICAL ENGINEER

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ROBERT BEIN, WILLIAM FROST & ASSOCIATES

NOTICE TO CONTRACTORS

CONTRACT NO. 43A0004A

Sealed proposals for the work shown on the plans entitled:

**PROJECT PLANS FOR CONSTRUCTION ON STATE HIGHWAY IN SAN DIEGO
COUNTY AT VARIOUS LOCATIONS**

will be received at Robert Bein, William Frost & Associates, 14725 Alton Parkway, Irvine, California 92618-2069, until 2 o'clock p.m. on July 21, 1998, at which time they will be publicly opened and read in the Boardroom at the same address.

Proposal forms for this work are included in a separate book entitled:

**ROBERT BEIN, WILLIAM FROST & ASSOCIATES; PROPOSAL AND CONTRACT
FOR CONSTRUCTION ON STATE HIGHWAY IN SAN DIEGO COUNTY AT
VARIOUS LOCATIONS**

General work description: Construct various storm drain improvements and associated electrical and miscellaneous improvements at seven (7) separate locations on State property in San Diego County as part of a Stormwater Best Management Practices program sponsored by the State of California, Department of Transportation.

This project has a goal of 10 percent disadvantaged business enterprise (DBE) participation.

A pre-bid meeting is scheduled for this project on Tuesday, June 30, 1998 at 10:00 a.m. in the Boardroom of Robert Bein, William Frost & Associates at 14725 Alton Parkway, Irvine, California.

**THIS PROJECT IS SUBJECT TO THE "BUY AMERICA" PROVISIONS OF THE
SURFACE TRANSPORTATION ASSISTANCE ACT OF 1982 AS AMENDED BY THE INTERMODAL
SURFACE TRANSPORTATION EFFICIENCY ACT OF 1991.**

Bids are required for the entire work described herein.

At the time this contract is awarded, the Contractor shall possess a Class A license.

This contract is subject to state contract nondiscrimination and compliance requirements pursuant to Government Code, Section 12990.

Project plans, special provisions, and proposal forms for bidding this project can only be obtained at Robert Bein, William Frost & Associates (Attention: Jerome Ruddins), 14725 Alton Parkway, Irvine, California, 92618-2069, FAX No. (949) 472-8373, Telephone No. (949) 855-3634. Project plans, special provisions, and proposal forms may be seen at the above office of Robert Bein, William Frost & Associates. Standard Specifications and Standard Plans are available through the State of California, Department of Transportation, Publications Unit, 1900 Royal Oaks Drive, Sacramento, CA 95815, Telephone No. (916) 445-3520.

The successful bidder shall furnish a payment bond and a performance bond.

Pursuant to Section 1773 of the Labor Code, the general prevailing wage rates in the county, or counties, in which the work is to be done have been determined by the Director of the California Department of Industrial Relations. These wages are set forth in the General Prevailing Wage Rates for this project, available at the Labor Compliance Office at the offices of the District Director of Transportation for the district in which the work is situated, and available from the California Department of Industrial Relations' Internet Web Site at: <http://www.dir.ca.gov>. Future effective general prevailing wage rates which have been predetermined and are on file with the California Department of Industrial Relations are referenced but not printed in the general prevailing wage rates.

COPY OF ENGINEER'S ESTIMATE
(NOT TO BE USED FOR BIDDING PURPOSES)

SITE 1 - KEARNY MESA MAINTENANCE STATION

Item	Item Description	Quantity	Unit	Unit Cost	Cost
100	Mobilization	1.0	LS		
101	Clearing and Grubbing	1.0	LS		
102	50mm Plastic Conduit	4.8	M		
103	250mm AP	1.7	M		
104	380mm AP	30.3	M		
105	380mm DIP	6.8	M		
106	900mm RCP	4.1	M		
107	Minor Concrete (Minor Structure)	5.9	M ³		
108	Minor Concrete (Misc Construction)	2.1	M ³		
(F) 109	Miscellaneous Iron and Steel	780.0	KG		
110	Palmer-Bowlus Flume	2.0	EA		
111	Compost Filter BMP	3.0	EA		
112	300mm AP	9.1	M		
113	Pretreatment Vault	1.0	EA		

(F) Denotes Final Pay Item

SITE 2 - ESCONDIDO MAINTENANCE STATION

Item	Item Description	Quantity	Unit	Unit Cost	Cost
200	Mobilization	1.0	LS		
201	Clearing and Grubbing	1.0	LS		
202	50mm Plastic Conduit	7.5	M		
203	150mm AP	10.0	M		
204	200 mm AP	4.3	M		
205	300 mm AP	7.7	M		
206	380mm AP	27.3	M		
207	900mm RCP	2.5	M		
208	Electrical Systems	1.0	LS		
209	Minor Concrete (Minor Structure)	4.9	M ³		
210	Minor Concrete (Misc Construction)	3.3	M ³		
(F) 211	Miscellaneous Iron and Steel	1329.0	KG		
212	Type II Sand Filter	1.0	EA		
213	Palmer-Bowlus Flume	2.0	EA		

(F) Denotes Final Pay Item

SITE 3 - LA COSTA PARK AND RIDE

Item	Item Description	Quantity	Unit	Unit Cost	Cost
300	Mobilization	1.0	LS		
301	Clearing and Grubbing	1.0	LS		
302	Remove Drainage Facility	1.0	EA		
303	Remove Pipe	4.8	M		
304	Remove AC Curb/Dike	44.0	M		
305	Remove AC	423.0	M ²		
306	50mm Plastic Conduit	6.4	M		
307	380mm AP	41.3	M		
308	900mm RCP	3.7	M		
309	1200mm RCP	1.9	M		
310	Minor Concrete (Minor Structure)	1.9	M ³		
311	Minor Concrete (Misc Construction)	5.2	M ³		
(F) 312	Miscellaneous Iron and Steel	310.5	KG		
313	Chain Link Gate	4.0	EA		
314	Chain Link Fence	76.0	M		
315	Type I Sand Filter	1.0	EA		
316	Parshall Flume	1.0	EA		
317	Palmer-Bowlus Flume	1.0	EA		
318	Electrical Systems	1.0	LS		
319	Asphalt Concrete Dike	48.0	M		
320	Asphalt Concrete (Type B)	78.3	TONN		
321	Aggregate Base (Class II)	136.0	TONN		

(F) Denotes Final Pay Item

Contract No. 43A0004A

AS-BUILT

Contract No. 11-059104, CCO No. 8

AS-CONSTRUCTED

SITE 4 - I-5/SR-78 PARK AND RIDE

Item	Item Description	Quantity	Unit	Unit Cost	Cost
400	Mobilization	1.0	LS		
401	Clearing and Grubbing	1.0	LS		
402	Traffic Control System	1.0	LS		
403	Construction Area Signs	1.0	LS		
404	Traffic Plastic Drums	8.0	EA		
405	Temporary Railing(Type k)	92.0	M		
406	Temporary Crash Cushion Module	12.0	EA		
407	Relocate Irrigation System	1.0	LS		
408	Remove Concrete Curb	8.0	M		
409	Remove Pipe	4.8	M		
410	Remove Fence	41.0	M		
411	Remove Drainage Facility	3.0	EA		
412	Aggregate Base (Class II)	119.3	TONN		
413	Asphalt Concrete Dike	10.0	M		
414	Asphalt Concrete (Type B)	69.1	TONN		
415	Minor Concrete (Misc Construction)	8.3	M ³		
416	Minor Concrete (Minor Structure)	6.7	M ³		
417	50mm Plastic Conduit	4.4	M		
418	200mm AP	17.1	M		
419	250mm AP	12.1	M		
420	380mm AP	5.0	M		
421	450mm AP	10.1	M		
422	900mm RCP	10.3	M		
423	450mm CSP(Smooth)	20.8	M		
(F) 424	Miscellaneous Iron and Steel	745.0	KG		
425	Type I Sand Filter	1.0	EA		
426	Palmer-Bowlus Flume	2.0	EA		
427	Junction Structure	1.0	EA		
428	Chain Link Gate	4.0	EA		
429	Chain Link Fence	85.0	M		

SITE 5 - SR-78/MELROSE DRIVE

Item	Item Description	Quantity	Unit	Unit Cost	Cost
500	Mobilization	1.0	LS		
501	Clearing and Grubbing	1.0	LS		
502	Traffic Control System	1.0	LS		
503	Construction Area Signs	1.0	LS		
504	Traffic Plastic Drums	8.0	EA		
505	Temporary Railing (Type k)	170.0	M		
506	Temporary Crash Cushion Module	12.0	EA		
507	Remove Fence	6.2	M		
508	Remove AC Curb/Dike	12.0	M		
509	Ditch Excavation	625.6	M ³		
510	Place AC (Misc Area)	20.0	M ²		
511	Asphalt Concrete (Type B)	4.6	TONN		
512	50mm Plastic Conduit	14.0	M		
513	300mm AP	16.7	M		
514	900mm RCP	0.8	M		
515	Minor Concrete (Minor Structure)	0.3	M ³		
516	Minor Concrete (Misc Construction)	3.9	M ³		
(F) 517	Miscellaneous Iron and Steel	51.0	KG		
518	Chain Link Gate	2.0	EA		
519	Trapezoidal Flume	2.0	EA		
520	Bio-Filter Swale BMP	834.0	M ²		

SITE 6 - I-5/PALOMAR AIRPORT ROAD

Item	Item Description	Quantity	Unit	Unit Cost	Cost
600	Mobilization	1.0	LS		
601	Clearing and Grubbing	1.0	LS		
602	Traffic Control System	1.0	LS		
603	Construction Area Signs	1.0	LS		
604	Traffic Plastic Drums	8.0	EA		
605	Temporary Railing (Type k)	220.0	M		
606	Temporary Crash Cushion Module	12.0	EA		
607	Remodel Drainage Facility	1.0	EA		
608	Relocate Irrigation System	1.0	LS		
609	Ditch Excavation	410.0	M ³		
610	Aggregate Base (Class II)	119.3	TONN		
611	Asphalt Concrete (Type B)	64.1	TONN		
612	Minor Concrete (Misc Construction)	157.1	M ³		
613	50mm Plastic Conduit	34.0	M		
614	Bio-Filter Swale BMP	702.0	M ²		
615	Trapezoidal Flume	2.0	EA		

SITE 7 - CARLSBAD MAINTENANCE STATION

Item	Item Description	Quantity	Unit	Unit Cost	Cost
700	Mobilization	1.0	LS		
701	Clearing and Grubbing	1.0	LS		
702	Remove AC	871.0	M ²		
703	Remove AC Curb/Dike	2.0	M		
704	Remove Concrete (Gutter)	67.0	M ²		
705	Remove Concrete Curb	66.0	M		
706	Ditch Excavation	110.0	M ³		
707	Infiltration Trench	1.0	EA		
708	Aggregate Base (Class II)	768.0	TONN		
709	Asphalt Concrete (Type B)	415.0	TONN		
710	Minor Concrete (Misc Construction)	39.3	M ³		
711	Electrical Systems	1.0	LS		
712	Trapezoidal Flume	1.0	EA		
713	Parshall Flume	1.0	EA		
714	50mm Plastic Conduit	10.0	M		
715	Bio-Filter Strip BMP	368.0	M ²		

SPECIAL PROVISIONS

Annexed to Contract No. 43A0004A

SECTION 1. SPECIFICATIONS AND PLANS

The work embraced herein shall be done in accordance with the Standard Specifications dated July, 1995, and the Standard Plans dated July, 1997, of the Department of Transportation insofar as the same may apply and in accordance with the following special provisions.

In case of conflict between the Standard Specifications and these special provisions, the special provisions shall take precedence over and be used in lieu of the conflicting portions.

SECTION 2. PROPOSAL REQUIREMENTS AND CONDITIONS

2-1.01 GENERAL

The bidder's attention is directed to the provisions in Section 2, "Proposal Requirements and Conditions," of the Standard Specifications and these special provisions for the requirements and conditions which the bidder must observe in the preparation of the proposal form and the submission of the bid.

In addition to the subcontractors required to be listed in accordance with Section 2-1.054, "Required Listing of Proposed Subcontractors," of the Standard Specifications, each proposal shall have listed therein the name and address of each DBE subcontractor to be used for credit in meeting the goals, and to whom the bidder proposes to directly subcontract portions of the work. The list of subcontractors shall also set forth the portion of work that will be done by each subcontractor listed. A sheet for listing the subcontractors is included in the Proposal.

The form of Bidder's Bond mentioned in the last paragraph in Section 2-1.07, "Proposal Guaranty," of the Standard Specifications will be found following the signature page of the Proposal.

In accordance with Public Contract Code Section 7106, a Noncollusion Affidavit is included in the Proposal. Signing the Proposal shall also constitute signature of the Noncollusion Affidavit.

2-1.015 FEDERAL LOBBYING RESTRICTIONS

Section 1352, Title 31, United States Code prohibits Federal funds from being expended by the recipient or any lower tier subrecipient of a Federal-aid contract to pay for any person for influencing or attempting to influence a Federal agency or Congress in connection with the awarding of any Federal-aid contract, the making of any Federal grant or loan, or the entering into of any cooperative agreement.

If any funds other than Federal funds have been paid for the same purposes in connection with this contract, the recipient shall submit an executed certification and, if required, submit a completed disclosure form as part of the bid documents.

A certification for Federal-aid contracts regarding payment of funds to lobby Congress or a Federal agency is included in the Proposal. Signing the Proposal shall constitute signature of the Certification.

The above-referenced certification and disclosure of lobbying activities shall be included in each subcontract and any lower-tier contracts exceeding \$100,000. All disclosure forms, but not certifications, shall be forwarded from tier to tier until received by the Engineer.

The Contractor, subcontractors and any lower-tier contractors shall file a disclosure form at the end of each calendar quarter in which there occurs any event that requires disclosure or that materially affects the accuracy of the information contained in any disclosure form previously filed by the Contractor, subcontractors and any lower-tier contractors. An event that materially affects the accuracy of the information reported includes:

- (1) A cumulative increase of \$25,000 or more in the amount paid or expected to be paid for influencing or attempting to influence a covered Federal action; or
 - (2) A change in the person(s) or individual(s) influencing or attempting to influence a covered Federal action;
- or,

(3) A change in the officer(s), employee(s), or Member(s) contacted to influence or attempt to influence a covered Federal action.

2-1.02 DISADVANTAGED BUSINESS

This project is subject to Part 23, Title 49, Code of Federal Regulations entitled "Participation By Minority Business Enterprise In Department of Transportation Programs." The Regulations in their entirety are incorporated herein by this reference.

Bidders shall be fully informed respecting the requirements of the Regulations and the Department of Transportation's Disadvantaged business (DBE) program developed pursuant to the Regulations; particular attention is directed to the following matters:

(a) A DBE must be a small business concern as defined pursuant to Section 3 of U.S. Small Business Act and relevant regulations promulgated pursuant thereto;

(b) A DBE bidder, not bidding as a joint venture with a non-DBE, will be required to meet the DBE goal through subcontracting or material purchases or make good faith effort to do so;

(c) A DBE may participate as a subcontractor, joint venture partner with a prime or subcontractor, or vendor of material or supplies;

(d) A DBE joint venture partner must be responsible for specific contract items of work, or portions thereof. Responsibility means actually performing, managing and supervising the work with its own forces. The DBE joint venture partner must share in the ownership, control, management responsibilities, risks and profits of the joint venture. The DBE joint venturer must submit the joint venture agreement, and either Schedule B of the Regulations or California Department of Transportation Business Enterprise Program form entitled "Minority/Disadvantaged/Women Business Enterprise Joint Venture." This information must be submitted with the DBE Information form required in "DBE Information" elsewhere in these special provisions;

(e) A DBE must perform a commercially useful function, i.e., must be responsible for the execution of a distinct element of the work and must carry out its responsibility by actually performing, managing and supervising the work;

(f) Credit for a DBE vendor of materials or supplies is limited to 60 percent of the amount to be paid to the vendor for the material unless the vendor manufactures or substantially alters the goods;

(g) Credit for trucking by DBEs will be as follows:

(i) The amount to be paid when a DBE trucker will perform the trucking with his/her own trucks, tractors and employees;

(ii) Twenty percent of the amount to be paid to DBE trucking brokers who do not have a "certified roster";

(iii) One hundred percent of the amount to be paid to DBE trucking brokers who have:

a. signed agreements that all trucking will be performed by DBE truckers if credit is toward DBE goal;

b. a "certified roster" showing that all trucks are owned by certified DBEs; and

c. a signed statement on the "certified roster" that indicates that 100 percent of revenue paid by the broker will be paid to the DBEs listed on the "certified roster".

(iv) Twenty percent of the amount to be paid to trucking brokers who are not a DBE but who have:

a. signed agreements with DBE truckers assuring that at least 20 percent of the trucking will be performed by DBE truckers if credit is toward DBE goal;

b. a "certified roster" showing that at least 20 percent of the number of trucks are owned by certified DBE truckers, as appropriate; and

c. a signed statement on the "certified roster" that indicates that at least 20 percent of the revenue paid by the broker will be paid to the DBEs listed on the "certified roster".

The "certified roster" referred to herein shall conform to the requirements in Section 3-1.01A, "DBE Information," of these special provisions;

(h) DBEs and DBE joint venture partners must be certified as of the date of bid opening either by the California Department of Transportation, or by a participating State of California or local agency which certifies in accordance with Title 49, Code of Federal Regulations, Part 23. Listings of DBEs certified by the Department are available from the following sources:

(i) The Department's DB/WBE Directory, which is published quarterly. The DB/WBE Directory may be obtained from the Department of Transportation, Materiel Operations Branch, Publication Distribution Unit, 1900 Royal Oaks Drive, Sacramento, California 95815, Telephone: (916) 445-3520;

(ii) The Department's Electronic Information Bulletin Board Service (DB/WBE/BBS), which is accessible by modem and is updated weekly. The DB/WBE/BBS may be accessed by first contacting the Department's Business Enterprise Program at Telephone: (916) 227-8937 and obtaining a user identification and password;

It is the Contractor's responsibility to verify that DBEs are certified;

(i) Noncompliance by the Contractor with the requirements of the regulations constitutes a breach of this contract and may result in termination of the contract or other appropriate remedy for a breach of this contract;

(j) Bidders are encouraged to utilize services offered by banks owned and controlled by minorities or women.

2-1.03 DBE GOAL FOR THIS PROJECT

The following goal for disadvantaged businesses (DBE) participation has been established for this project:

Disadvantaged business (DBE) **10 percent**

It is the bidder's responsibility to make a sufficient portion of the work available to subcontractors and suppliers and to select those portions of the work or material needs consistent with the available DBE subcontractors and suppliers, so as to assure meeting the goal for DBE participation.

SECTION 3. SUBMISSION OF DBE INFORMATION AND AWARD AND EXECUTION OF CONTRACT

3-1.01 GENERAL

The bidder's attention is directed to the provisions in Section 3, "Award and Execution of Contract," of the Standard Specifications and these special provisions for the requirements and conditions concerning submittal of DBE information and award and execution of contract.

The contract shall be signed by the successful bidder and shall be received with contract bonds by Robert Bein, William Frost & Associates (Attention: Jerome Ruddins) within 4 days, not including Saturdays, Sundays and legal holidays, after the bidder has received notice that the contract has been awarded. The executed contract documents shall be delivered to the following address: Robert Bein, William Frost & Associates, 14725 Alton Parkway, Irvine, California 92618-2069 (Attention: Jerome Ruddins).

The required DBE information shall be submitted on the "BIDDER - DBE INFORMATION" form included in the Proposal.

It is the bidder's responsibility to meet the goal for DBE participation or to provide information to establish that, prior to bidding, the bidder made good faith efforts to do so.

3-1.01A DBE INFORMATION

The bidder's DBE information shall establish that the DBE goal will be met or that a good faith effort to meet the goal has been made.

Bidders are cautioned that even though their submittal indicates they will meet the stated DBE goal, their submittal should also include their good faith efforts information along with their DBE goal information to protect their eligibility for award of the contract in the event Robert Bein, William Frost & Associates, in its review, finds that the goal has not been met.

The information to show that the DBE goal will be met shall include the names of DBEs and DBE joint venture partners to be used, with a complete description of work or supplies to be provided by each and the dollar value of each DBE transaction. When 100 percent of a contract item of work is not to be performed or furnished by a DBE, a description of the exact portion of that work to be performed or furnished by that DBE shall be included in the DBE information, including the planned location of that work. (Note: DBE subcontractors to whom the bidder proposes to directly subcontract portions of the work are to be named in the bid. - See Section 2-1.054, "Required Listing of Proposed Subcontractors," of the Standard Specifications and Section 2-1.01, "General," of these special provisions, regarding listing of proposed subcontractors.)

If credit for trucking by a DBE trucking broker is shown on the bidder's information as 100 percent of the revenue to be paid by the broker is to be paid to DBE truckers, a "certified roster" of the broker's trucks to be used must be included. The "certified roster" must indicate that all the trucks are owned by certified DBEs and must show the DBE truck numbers, owner's name, Public Utilities Commission Cal-T numbers, and the DBE certification

numbers. The roster must indicate that all revenue paid by the broker will be paid to DBEs listed on the "certified roster".

If credit for trucking by a trucking broker who is not a DBE is shown in the bidder's information, a "certified roster" of the broker's trucks to be used must be included. The "certified roster" must indicate that at least 20 percent of the broker's trucks are owned by certified DBEs and must show the DBE truck numbers, owner's name, Public Utilities Commission Cal-T numbers, and the DBE certification numbers. The roster must indicate that at least 20 percent of the revenue paid by the broker will be paid to DBEs listed on the "certified roster".

The information necessary to establish the bidder's good faith efforts to meet the DBE goal should include:

(1) The names and dates of advertisement of each newspaper, trade paper, and minority-focus paper in which a request for DBE participation for this project was placed by the bidder.

(2) The names and dates of written notices sent to certified DBEs soliciting bids for this project and the dates and methods used for following up initial solicitations to determine with certainty whether the DBEs were interested.

(3) The items of work which the bidder made available to DBE firms, including, where appropriate, any breaking down of the contracts into economically feasible units to facilitate DBE participation, and the information furnished to DBEs such as plans, specifications, and requirements for the work. It is the bidder's responsibility to demonstrate that sufficient work to meet the DBE goal was made available to DBE firms.

(4) The names of DBEs who submitted bids which were not accepted, a summary of the bidder's discussions and/or negotiations with them, the name of the firm selected for that portion of work, and the reasons for the bidder's choice.

(5) Efforts made to assist DBEs in obtaining bonding, lines of credit or insurance, and any technical assistance related to the plans, specifications and requirements for the work which was provided to DBEs.

(6) Any additional data to support a demonstration of good faith effort, such as contacts with DBE assistance agencies.

3-1.01B AWARD OF CONTRACT

The award of contract, if it be awarded, will be to the lowest responsible bidder whose proposal complies with all the requirements prescribed and who has met the goal for DBE participation or has demonstrated, to the satisfaction of Robert Bein, William Frost & Associates, good faith effort to do so. Meeting the goal for DBE participation or demonstrating, to the satisfaction of Robert Bein, William Frost & Associates, good faith efforts to do so is a condition for being eligible for award of contract.

SECTION 4. BEGINNING OF WORK, TIME OF COMPLETION AND LIQUIDATED DAMAGES

Attention is directed to the provisions in Section 8-1.03, "Beginning of Work," in Section 8-1.06, "Time of Completion," in Section 8-1.07, "Liquidated Damages," and in Section 8-1.11, "Termination of Contract" of the Standard Specifications and these special provisions.

Attention is directed to the provisions in Article VI of the Proposal and Contract whereby reference is made to funding requirements (Article VIII contained in Appendix A within the Proposal and Contract) for this contract.

The Contractor shall begin work within 2 days, not including Saturdays, Sundays and legal holidays, after the contract has been approved by Robert Bein, William Frost & Associates.

The work for this project consists of all work required to complete the seven (7) separate sites. Construction for any individual site may be terminated at any time by Robert Bein, William Frost & Associates. Provisions of Section 8-1.11 "Termination of Contract" of the Standard Specifications will be applicable for the termination of work on any individual site.

The work shall be diligently prosecuted to completion before the expiration of

68 WORKING DAYS

beginning on the second day, not including Saturdays, Sundays and legal holidays, after approval of the contract.

The Contractor shall pay to the Robert Bein, William Frost and Associates the sum of \$900 per day, for each and every calendar day's delay in finishing the work in excess of the number of working days prescribed above.

In addition to the above stated liquidated damages, an additional \$5,000 per day shall be paid to Robert Bein, William Frost and Associates for each and every day after November 30, 1998 that is required to complete the project. This is to conform to a Court ordered Consent Degree (Case No. 97-0037-IEG).

The time limit specified for completion of the work contemplated herein is considered insufficient to permit completion of the work by the Contractor working a normal number of hours per day or week on a single shift basis. Additional shifts may be required to the extent necessary to ensure that the work will be completed within the time limit specified.

Full compensation for any additional costs occasioned by compliance with the provisions in this section shall be considered as included in the prices paid for the various contract items of work and no additional compensation will be allowed therefor.

SECTION 5. GENERAL

SECTION 5-1. MISCELLANEOUS

5-1.01 LABOR NONDISCRIMINATION

Attention is directed to the following Notice that is required by Chapter 5 of Division 4 of Title 2, California Code of Regulations.

NOTICE OF REQUIREMENT FOR NONDISCRIMINATION PROGRAM (GOV. CODE, SECTION 12990)

Contractor's attention is called to the "Nondiscrimination Clause", set forth in Section 7-1.01A(4), "Labor Nondiscrimination," of the Standard Specifications, and to the "Standard California Nondiscrimination Construction Contract Specifications" set forth therein.

5-1.02 PUBLIC SAFETY

The Contractor shall provide for the safety of traffic and the public in accordance with the provisions in Section 7-1.09, "Public Safety," of the Standard Specifications and these special provisions.

The Contractor shall install temporary railing (Type K) between any lane carrying public traffic and any excavation, obstacle, or storage area when the following conditions exist:

- (1) Excavations.—Any excavation, the near edge of which is 3.6 m or less from the edge of the lane, except:
 - (a) Excavations covered with sheet steel or concrete covers of adequate thickness to prevent accidental entry by traffic or the public.
 - (b) Excavations less than 0.3-m deep.
 - (c) Trenches less than 0.3-m wide for irrigation pipe or electrical conduit, or excavations less than 0.3-m in diameter.
 - (d) Excavations parallel to the lane for the purpose of pavement widening or reconstruction.
 - (e) Excavations in side slopes, where the slope is steeper than 1:4 (vertical:horizontal).
 - (f) Excavations protected by existing barrier or railing.
- (2) Temporarily Unprotected Permanent Obstacles.—Whenever the work includes the installation of a fixed obstacle together with a protective system, such as a sign structure together with protective railing, and the Contractor elects to install the obstacle prior to installing the protective system; or whenever the Contractor, for the Contractor's convenience and with permission of the Engineer, removes a portion of an existing protective railing at an obstacle and does not replace such railing complete in place during the same day.
- (3) Storage Areas.—Whenever material or equipment is stored within 3.6 m of the lane and the storage is not otherwise prohibited by the specifications.

The approach end of temporary railing (Type K), installed in accordance with the requirements in this section "Public Safety" and in Section 7-1.09, "Public Safety," of the Standard Specifications shall be offset a minimum of 4.6 m from the edge of the traffic lane open to public traffic. The temporary railing shall be installed on a skew toward the edge of the traffic lane of not more than 0.3-m transversely to 3 m longitudinally with respect to the edge of the traffic lane. If the 4.6-m minimum offset cannot be achieved, the temporary railing shall be installed on the 10 to 1 skew to obtain the maximum available offset between the approach end of the railing and the edge of the traffic lane, and an array of temporary crash cushion modules shall be installed at the approach end of the temporary railing.

Temporary railing (Type K) shall conform to the provisions in Section 12-3.08, "Temporary Railing (Type K)" of the Standard Specifications, except temporary railing (Type K) fabricated prior to January 1, 1993, with one longitudinal No. 15 reinforcing steel bar near the top in lieu of the 2 longitudinal No. 15 reinforcing steel bars near the top, as shown on the plans, may be used.

Temporary crash cushion modules shall conform to the provisions in "Temporary Crash Cushion Module" elsewhere in these special provisions.

Except for installing, maintaining and removing traffic control devices, whenever work is performed or equipment is operated in the following work areas the Contractor shall close the adjacent traffic lane unless otherwise provided in the specifications:

Approach speed of public traffic (Posted Limit) (Kilometers Per Hour)	Work Areas
Over 72 (45 Miles Per Hour)	Within 1.8 m of a traffic lane but not on a traffic lane
56 to 72 (35 to 45 Miles Per Hour)	Within 0.9-m of a traffic lane but not on a traffic lane

The lane closure provisions of this section shall not apply if the work area is protected by permanent or temporary railing or barrier.

When traffic cones or delineators are used to delineate a temporary edge of traffic lane, the line of cones or delineators shall be considered to be the edge of traffic lane, however, the Contractor shall not reduce the width of an existing lane to less than 3 m without written approval from the Engineer.

When work is not in progress on a trench or other excavation that required closure of an adjacent lane, the traffic cones or portable delineators used for the lane closure shall be placed off of and adjacent to the edge of the traveled way. The spacing of the cones or delineators shall be not more than the spacing used for the lane closure.

Suspended loads or equipment shall not be moved nor positioned over public traffic or pedestrians.

Full compensation for conforming to the requirements in this section "Public Safety," including furnishing and installing temporary railing (Type K) and temporary crash cushion modules, shall be considered as included in the contract prices paid for the various items of work involved and no additional compensation will be allowed therefor.

5-1.03 SURFACE MINING AND RECLAMATION ACT

Attention is directed to the Surface Mining and Reclamation Act of 1975, commencing in Public Resources Code, Mining and Geology, Section 2710, which establishes regulations pertinent to surface mining operations.

Material from mining operations furnished for this project shall only come from permitted sites in compliance with the Surface Mining and Reclamation Act of 1975.

The requirements of this section shall apply to all materials furnished for the project, except for acquisition of materials in conformance with Section 4-1.05, "Use of Materials Found on the Work," of the Standard Specifications.

5-1.04 REMOVAL OF ASBESTOS AND HAZARDOUS SUBSTANCES

When the presence of asbestos or hazardous substances are not shown on the plans or indicated in the specifications and the Contractor encounters materials which the Contractor reasonably believes to be asbestos or a hazardous substance as defined in Section 25914.1 of the Health and Safety Code, and the asbestos or hazardous substance has not been rendered harmless, the Contractor may continue work in unaffected areas reasonably believed to be safe, and shall immediately cease work in the affected area and report the condition to the Engineer in writing.

In accordance with Section 25914.1 of the Health and Safety Code, all such removal of asbestos or hazardous substances including any exploratory work to identify and determine the extent of the asbestos or hazardous substance will be performed by separate contract.

If delay of work in the area delays the current controlling operation, the delay will be considered a right of way delay and the Contractor will be compensated for the delay as provided in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

5-1.05 YEAR 2000 COMPLIANCE

This contract is subject to Year 2000 Compliance for automated devices in the State of California. Year 2000 compliance is defined as follows:

Year 2000 compliance for automated devices in the State of California is achieved when embedded functions have or create no logical or mathematical inconsistencies when dealing with dates prior to and beyond 1999. The

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year 2000 is recognized and processed as a leap year. The product must also operate accurately in the manner in which it was intended for date operation without requiring manual intervention.

The Contractor shall provide the Engineer a Certificate of Compliance from the manufacturer in accordance with the provisions of Section 6-1.07, "Certificates of Compliance," of the Standard Specifications for all automated devices furnished for the project.

5-1.06 BUY AMERICA REQUIREMENTS

Attention is directed to the "Buy America" requirements of the Surface Transportation Assistance Act of 1982 (Section 165) and the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) Sections 1041(a) and 1048(a), and the regulations adopted pursuant thereto. In accordance with the law and regulations, all manufacturing processes for steel and iron materials furnished for incorporation into the work on this project shall occur in the United States; with the exception that pig iron and processed, palletized and reduced iron ore manufactured outside of the United States may be used in the domestic manufacturing process for such steel and iron materials. The application of coatings, such as epoxy coating, galvanizing, painting and any other coating that protects or enhances the value of steel or iron materials shall be considered a manufacturing process subject to the "Buy America" requirements.

A Certificate of Compliance, conforming to the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications, shall be furnished for steel and iron materials. The certificates, in addition to certifying that the materials comply with the specifications, shall also specifically certify that all manufacturing processes for the materials occurred in the United States, except for the above exceptions.

The requirements imposed by the law and regulations do not prevent a minimal use of foreign steel and iron materials if the total combined cost of the materials used does not exceed one-tenth of one percent (0.1%) of the total contract cost or \$2500, whichever is greater. The Contractor shall furnish the Engineer acceptable documentation of the quantity and value of any foreign steel and iron prior to incorporating the materials into the work.

5-1.07 DBE RECORDS

The Contractor shall maintain records of all subcontracts entered into with certified DBE subcontractors and records of materials purchased from certified DBE suppliers. The records shall show the name and business address of each DBE subcontractor or vendor and the total dollar amount actually paid each DBE subcontractor or vendor.

Upon completion of the contract, a summary of these records shall be prepared on Form CEM-2402 and certified correct by the Contractor or the Contractor's authorized representative, and shall be furnished to the Engineer.

5-1.075 PERFORMANCE OF DBE SUBCONTRACTORS AND SUPPLIERS

The DBEs listed by the Contractor in response to the requirements in the section of these special provisions entitled "Submission of DBE Information, Award, And Execution Of Contract", which are determined by Robert Bein, William Frost & Associates to be certified DBEs, shall perform the work and supply the materials for which they are listed unless the Contractor has received prior written authorization to perform the work with other forces or to obtain the materials from other sources.

Authorization to utilize other forces or sources of materials may be requested for the following reasons:

- (1) The listed DBE, after having had a reasonable opportunity to do so, fails or refuses to execute a written contract, when such written contract, based upon the general terms, conditions, plans and specifications for the project, or on the terms of such subcontractor's or supplier's written bid, is presented by the Contractor.
- (2) The listed DBE becomes bankrupt or insolvent.
- (3) The listed DBE fails or refuses to perform the subcontract or furnish the listed materials.
- (4) The Contractor stipulated that a bond was a condition of executing a subcontract and the listed DBE subcontractor fails or refuses to meet the bond requirements of the Contractor.
- (5) The work performed by the listed subcontractor is substantially unsatisfactory and is not in substantial accordance with the plans and specifications, or the subcontractor is substantially delaying or disrupting the progress of the work.
- (6) It would be in the best interest of the State of California, Department of Transportation.

The Contractor shall not be entitled to any payment for such work or material unless it is performed or supplied by the listed DBE or by other forces (including those of the Contractor) pursuant to prior written authorization of the Engineer.

The Contractor shall submit monthly documentation to the Engineer that shows the amount paid to DBE truckers under trucking brokers listed in the Contractor's DBE information. The records must confirm that no less than 20 percent was paid to DBE truckers by brokers who are not DBEs and that all the revenue paid by DBE brokers was paid to DBE truckers if the Contractor indicated in the DBE information that the broker had signed agreements with DBE truckers that the trucking will be performed by DBE truckers.

5-1.08 AREAS FOR CONTRACTOR'S USE

Attention is directed to the requirements specified in Section 7-1.19, "Rights in Land and Improvements," of the Standard Specifications and these special provisions.

The highway right of way shall be used only for purposes that are necessary to perform the required work. The Contractor shall not occupy the right of way, or allow others to occupy the right of way, for purposes which are not necessary to perform the required work.

There are no State-owned parcels adjacent to the right of way for the exclusive use of the Contractor within the contract limits. The Contractor shall secure, at the Contractor's own expense, any area required for plant sites, storage of equipment or materials, or for other purposes.

No area is available within the contract limits for the exclusive use of the Contractor. However, temporary storage of equipment and materials on State property may be arranged with the Engineer, subject to the prior demands of State maintenance forces and to all other contract requirements. Use of the Contractor's work areas and other State-owned property shall be at the Contractor's own risk, and the State shall not be held liable for any damage to or loss of materials or equipment located within such areas.

5-1.09 PAYMENTS

Attention is directed to Section 9-1.06, "Partial Payments," and 9-1.07, "Payment After Acceptance," of the Standard Specifications and these special provisions.

For the purpose of making partial payments pursuant to Section 9-1.06, "Partial Payments," of the Standard Specifications, the amount set forth for the contract items of work hereinafter listed shall be deemed to be the maximum value of the contract item of work which will be recognized for progress payment purposes.

Clearing and Grubbing	\$35,000 (Aggregate Total for all 7 construction sites at \$5,000 each)
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After acceptance of the contract pursuant to Section 7-1.17, "Acceptance of Contract," of the Standard Specifications, the amount, if any, payable for a contract item of work in excess of the maximum value for progress payment purposes hereinabove listed for the item, will be included for payment in the first estimate made after acceptance of the contract.

No partial payment will be made for any materials on hand which are furnished but not incorporated in the work.

The Contractor will be paid within 45 calendar days of receipt of the estimated value of the work done for each monthly period, less retentions as specified in Section 9-1.06 "Partial Payments" of the Standard Specifications.

5-1.10 SOUND CONTROL REQUIREMENTS

Sound control shall conform to the provisions in Section 7-1.01I, "Sound Control Requirements," of the Standard Specifications and these special provisions.

The noise level from the Contractor's operations, between the hours of 7:00 p.m. and 7:00 a.m., shall not exceed 86 dBA at a distance of 15 m. This requirements in no way relieves the Contractor from responsibility for complying with local ordinances regulating noise level outside the limits of the State right of way.

The noise level requirement specified herein shall apply to the equipment on the job or related to the job, including but not limited to trucks, transit mixers or transient equipment that may or may not be owned by the Contractor. The use of loud sound signals shall be avoided in favor of light warnings except those required by safety laws for the protection of personnel.

Full compensation for conforming to the requirements of this section shall be considered as included in the prices paid for the various contract items of work involved and no additional compensation will be allowed therefor.

5-1.11 ENCROACHMENT PERMIT

Contractor shall adhere to all requirements and special provisions of the encroachment permit for work on State property for this project. A copy of the approved encroachment permit is contained within Appendix A of this Notice to Contractors and Special Provisions.

Full compensation for adhering to the requirements of the special provisions of the encroachment permit shall be considered as included in the various contract items of work and no additional compensation will be allowed therefor.

SECTION 6. (BLANK)

SECTION 7. (BLANK)

SECTION 8. MATERIALS

SECTION 8-1. MISCELLANEOUS

8-1.01 SUBSTITUTION OF NON-METRIC MATERIALS AND PRODUCTS

Only materials and products conforming to the requirements of the specifications shall be incorporated in the work. When metric materials and products are not available, and when approved by the Engineer, and at no cost to RBF, materials and products in the inch-pound (imperial) system which are of equal quality and of the required properties and characteristics for the purpose intended, may be substituted for the equivalent metric materials and products, subject to the following requirements:

Materials and products shown on the plans or in the special provisions as being equivalent may be substituted for the metric materials and products specified or detailed on the plans.

Before other non-metric materials and products will be considered for use the Contractor shall furnish, at the Contractor's expense, evidence satisfactory to the Engineer that the materials and products proposed for use are equal to or better than the materials and products specified or detailed on the plans. The burden of proof as to the quality and suitability of substitutions shall be upon the Contractor and the Contractor shall furnish all information necessary as required to the Engineer. The Engineer will be the sole judge as to the quality and suitability of the substituted materials and products and the Engineer's decision shall be final.

When the Contractor elects to substitute non-metric materials and products, including materials and products shown on the plans or in the special provisions as being equivalent, the list of sources of material as specified in Section 6-1.01, "Source of Supply and Quality of Materials," of the Standard Specification shall include a list of substitutions to be made and contract items involved. In addition, for any change in design or details the Contractor shall submit plans and working drawings in accordance with Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications.

Attention is directed to "Reinforcement" in these special provisions for allowable substitutions of imperial reinforcing bars for metric reinforcing bars.

The following substitutions of materials and products will be allowed:

SUBSTITUTION TABLE FOR SIZES OF HIGH STRENGTH STEEL FASTENERS
ASTM Designation: A 325M

METRIC SIZE SHOWN ON THE PLANS mm x thread pitch	IMPERIAL SIZE TO BE SUBSTITUTED inch
M16 x 2	5/8
M20 x 2.5	3/4
M22 x 2.5	7/8
M24 x 3	1
M27 x 3	1-1/8
M30 x 3.5	1-1/4
M36 x 4	1-1/2

SUBSTITUTION TABLE FOR PLAIN WIRE REINFORCEMENT, ASTM Designation: A 82

METRIC SIZE SHOWN ON THE PLANS mm ²	US CUSTOMARY UNITS SIZE TO BE SUBSTITUTED inch ² x 100
MW9	W1.4
MW10	W1.6
MW13	W2.0
MW15	W2.3
MW19	W2.9
MW20	W3.1
MW22	W3.5
MW25	W3.9, except W3.5 in piles only
MW26	W4.0
MW30	W4.7
MW32	W5.0
MW35	W5.4
MW40	W6.2
MW45	W6.5
MW50	W7.8
MW55	W8.5, except W8.0 in piles only
MW60	W9.3
MW70	W10.9, except W11.0 in piles only
MW80	W12.4
MW90	W14.0
MW100	W15.5

The sizes in the following tables of materials and products are exact conversions of metric sizes of materials and products and are listed as acceptable equivalents:

CONVERSION TABLE FOR SIZES OF:

- (1) STEEL FASTENERS FOR GENERAL APPLICATIONS, ASTM Designation: A 307 or AASHTO Designation: M 314, Grade 36 or 55, and
- (2) HIGH STRENGTH STEEL FASTENERS, ASTM Designation: A 325 or A 449

METRIC SIZE SHOWN ON THE PLANS mm	EQUIVALENT IMPERIAL SIZE inch
6, or 6.35	1/4
8 or 7.94	5/16
10, or 9.52	3/8
11, or 11.11	7/16
13 or 12.70	1/2
14, or 14.29	9/16
16, or 15.88	5/8
19, or 19.05	3/4
22, or 22.22	7/8
24, 25, or 25.40	1
29, or 28.58	1-1/8
32, or 31.75	1-1/4
35, or 34.93	1-3/8
38 or 38.10	1-1/2
44, or 44.45	1-3/4
51, or 50.80	2
57, or 57.15	2-1/4
64, or 63.50	2-1/2
70 or 69.85	2-3/4
76, or 76.20	3
83, or 82.55	3-1/4
89 or 88.90	3-1/2
95, or 95.25	3-3/4
102, or 101.60	4

CONVERSION TABLE FOR NOMINAL THICKNESS OF SHEET METAL

UNCOATED HOT AND COLD ROLLED SHEETS		HOT-DIPPED ZINC COATED SHEETS (GALVANIZED)	
METRIC THICKNESS SHOWN ON THE PLANS	EQUIVALENT US STANDARD GAGE	METRIC THICKNESS SHOWN ON THE PLANS	EQUIVALENT GALVANIZED SHEET GAGE
mm	inch	mm	inch
7.94	0.3125	4.270	0.1681
6.07	0.2391	3.891	0.1532
5.69	0.2242	3.510	0.1382
5.31	0.2092	3.132	0.1233
4.94	0.1943	2.753	0.1084
4.55	0.1793	2.372	0.0934
4.18	0.1644	1.994	0.0785
3.80	0.1495	1.803	0.0710
3.42	0.1345	1.613	0.0635
3.04	0.1196	1.461	0.0575
2.66	0.1046	1.311	0.0516
2.28	0.0897	1.158	0.0456
1.90	0.0747	1.006 or 1.016	0.0396
1.71	0.0673	0.930	0.0366
1.52	0.0598	0.853	0.0336
1.37	0.0538	0.777	0.0306
1.21	0.0478	0.701	0.0276
1.06	0.0418	0.627	0.0247
0.91	0.0359	0.551	0.0217
0.84	0.0329	0.513	0.0202
0.76	0.0299	0.475	0.0187
0.68	0.0269		
0.61	0.0239		
0.53	0.0209		
0.45	0.0179		
0.42	0.0164		
0.38	0.0149		

CONVERSION TABLE FOR WIRE

METRIC THICKNESS SHOWN ON THE PLANS	EQUIVALENT USA STEEL WIRE THICKNESS	GAGE NO.
mm	inch	
6.20	0.244	3
5.72	0.225	4
5.26	0.207	5
4.88	0.192	6
4.50	0.177	7
4.11	0.162	8
3.76	0.148	9
3.43	0.135	10
3.05	0.120	11
2.69	0.106	12
2.34	0.092	13
2.03	0.080	14
1.83	0.072	15
1.57	0.062	16
1.37	0.054	17
1.22	0.048	18
1.04	0.041	19
0.89	0.035	20

CONVERSION TABLE FOR PIPE PILES

METRIC SIZE SHOWN ON THE PLANS mm x mm	EQUIVALENT IMPERIAL SIZE inch x inch
PP 360 x 4.55	NPS 14 x 0.179
PP 360 x 6.35	NPS 14 x 0.250
PP 360 x 9.53	NPS 14 x 0.375
PP 360 x 11.12	NPS 14 x 0.438
PP 406 x 12.70 and * PP 460 x 12.70	NPS 16 x 0.500

* Applies only to Standard Plan B2-11, Alternative "W" Steel
Pipe - Pile Details.

CONVERSION TABLE FOR STRUCTURAL TIMBER AND LUMBER

METRIC MINIMUM DRESSED DRY, SHOWN ON THE PLANS mm x mm	METRIC MINIMUM DRESSED GREEN, SHOWN ON THE PLANS mm x mm	EQUIVALENT NOMINAL US SIZE inch x inch
19x89	20x90	1x4
38x89	40x90	2x4
64x89	65x90	3x4
89x89	90x90	4x4
140x140	143x143	6x6
140x184	143x190	6x8
184x184	190x190	8x8
235x235	241x241	10x10
286x286	292x292	12x12

CONVERSION TABLE FOR NAILS AND SPIKES

METRIC COMMON NAIL, SHOWN ON THE PLANS Length, mm Diameter, mm	METRIC BOX NAIL, SHOWN ON THE PLANS Length, mm Diameter, mm	METRIC SPIKE, SHOWN ON THE PLANS Length, mm Diameter, mm	EQUIVALENT IMPERIAL SIZE Penny-weight
50.80 2.87	50.80 2.51	————	6d
63.50 3.33	63.50 2.87	————	8d
76.20 3.76	76.20 3.25	76.20 4.88	10d
82.55 3.76	82.55 3.25	82.55 4.88	12d
88.90 4.11	88.90 3.43	88.90 5.26	16d
101.60 4.88	101.60 3.76	101.60 5.72	20d
114.30 5.26	114.30 3.76	114.30 6.20	30d
127.00 5.72	127.00 4.11	127.00 6.68	40d
————	————	139.70 7.19	50d
————	————	152.40 7.19	60d

8-1.02 PREQUALIFIED AND TESTED SIGNING AND DELINEATION MATERIALS

The Department of Transportation (Department) maintains a trade name list of approved prequalified and tested signing and delineation materials and products. Approval of prequalified and tested products and materials shall not preclude the Engineer from sampling and testing of the signing and delineation materials or products at any time.

None of the listed signing and delineation materials and products shall be used in the work unless material or product is listed on RBF's List of Approved Traffic Products. A Certificate of Compliance shall be furnished as specified in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications for signing and delineation materials and products. The certificate shall also certify that the signing and delineation material or product conforms to the prequalified testing and approval of the Department of Transportation, Division of Traffic Operations and was manufactured in accordance with the approved quality control program.

Materials and products will be considered for addition to the approved prequalified and tested list if the manufacturer of the material or product submits to RBF a sample of the material or product. The sample shall be sufficient to permit performance of required tests. Approval of materials or products will be dependent upon a determination as to compliance with the specifications and test RBF may elect to perform.

The following is a listing of approved prequalified and tested signing and delineation materials and products:

Pavement Markers, Permanent Type

REFLECTIVE

1. Adelite (4"x4")
2. Apex, Model 921 (4"x4")
3. Pavement Markers, Inc., "Hye-Lite" (4"x4")
4. Ray-O-Lite, Models SS, RS and AA (4"x4")
5. Ray-O-Lite, Model 2002 (2.4"x4.7")
6. Stimsonite, Model 88 (4" x4")

REFLECTIVE WITH ABRASION RESISTANT SURFACE

1. Ray-O-Lite "AA" ARS (4"x4")(Not for use in recessed applications)
2. Ray-O-Lite Model 2002 ARS (2.2"x4.7")
3. Stimsonite, Model 911 (4"x4")(Not for use in recessed applications)
4. Stimsonite, Model 944 SB (2"x4")
5. Stimsonite, Model 948 (2.3"x4.7")
6. Stimsonite, Model 953 (2.75"x4.5")(Not for use in recessed applications)

NON-REFLECTIVE FOR USE WITH EPOXY OR BITUMEN ADHESIVE

1. Apex Universal (Ceramic)
2. Highway Ceramics, Inc. (Ceramic)
3. Zumar, TM40W/Y (Polyester)

NON-REFLECTIVE FOR USE WITH BITUMEN ADHESIVE ONLY

1. Apex Universal, Model 929 (ABS)
2. Elgin Molded Plastics, "Empco-Lite" Model 900 (ABS)
3. Hi-Way Safety, Inc., Models P20-2000W and 2001Y (ABS)
4. Interstate Sales, "Diamond Back" (ABS)
5. Loomis Plastics, D-Dot (ABS)
6. Pavement Markers, Inc., (Marker Supply) - Models A1107 and AY1108 (ABS)
7. Road Creations, Model RCB4NR (Acrylic)

Pavement Markers, Temporary Type

TEMPORARY MARKERS FOR LONG TERM DAY/NIGHT USE (6 months or less)

1. Apex Universal, Model 924 (4"x4")
2. Davidson Plastics, Model 3.0
3. Elgin Molded Plastics, "Empco-Lite" Model 901 (4" Round)
4. Highway Technologies, Megalites (4"x4")
5. Road Creations, Model R41C (4"x4")
6. Vega Molded Products "Temporary Road Marker" (3"x4")

TEMPORARY MARKERS FOR SHORT TERM DAY/NIGHT USE (14 days or less)

1. Apex Universal, Model 932

2. Davidson Plastics, Models TOM (Standard) with Reflexite PC-1000, or (WZ) with Reflexite AC-1000 Sheeting
3. Hi-Way Safety, Inc., Model 1280/1281 with Reflexite PC-1000

TEMPORARY MARKERS FOR SHORT TERM DAY/NIGHT USE (14 days or less at seal coat locations)

1. Apex Universal, Model 932
2. Davidson Plastics, Models TRPM (Standard) with Reflexite PC-1000, or (WZ) with Reflexite AC-1000 Sheeting
3. Davidson Plastics, Models "HH" (High Heat) TRPM (Standard) with Reflexite PC-1000, or (WZ) with Reflexite AC-1000 Sheeting
4. Hi-Way Safety, Inc., Model 1280/1281 with Reflexite PC-1000

Striping and Pavement Marking Materials

PERMANENT TRAFFIC STRIPING AND PAVEMENT MARKING TAPE (For use on high and low volume roadways)

1. Advanced Traffic Marking, Series 300 and 400
2. Brite-Line, Series 1000
3. Swarco Industries, "Director 35" (For transverse application only)
4. Swarco Industries, "Director 60"
5. 3M, "Stamark" Series 380, A420, A440 and 5730
6. 3M, "Stamark" Series N420 and N440 (For transverse application only)

PERMANENT TRAFFIC STRIPING AND PAVEMENT MARKING TAPE (For use on low volume roadways only)

1. 3M, "Stamark" Series A320 Bisymetric

TEMPORARY REMOVABLE STRIPING AND PAVEMENT MARKING TAPE

1. Advanced Traffic Marking, ATM Series 200
2. Brite-Line, Series 100
3. P.B. Laminations, Aztec, Grade 102
4. Swarco Industries, "Director-2"
5. 3M, "Stamark" Brand, Detour Grade, Series 5710 and A620

PREFORMED THERMOPLASTIC

1. Flint Trading, "Premark" and "Permark 20/20 Flex"
2. Pavemark, "Hotape"

REMOVABLE TRAFFIC PAINT

1. Belpro, Series 250/252 and No. 93 Remover

Class 1 Delineators

ONE-PIECE DRIVEABLE FLEXIBLE TYPE, 1700 mm (66")

1. Carsonite, Curve-Flex CFRM-400
2. Carsonite, Roadmarker CRM-375
3. Davidson Plastics, "Flexi-Guide Models 400 and 566"
4. GreenLine Model HWDI-66
5. GreenLine Model CGDI-66
6. J. Miller Industries, Model JMI-375 with soil anchor)

SPECIAL USE FLEXIBLE TYPE, 1200 mm (48")

1. Carsonite, "Survivor" with 18" U-Channel anchor
2. FlexStake, H-D
3. GreenLine HWD with 18" soil anchor

4. GreenLine CGD with 18" soil anchor
5. Safe-Hit with 8" pavement anchor (SH248-GP1)
6. Safe-Hit with 15" soil anchor (SH248-GP2)
7. Safe-Hit with 18" soil anchor (SH248-GP3)

SURFACE MOUNT FLEXIBLE TYPE, 1200 mm (48")

1. Bent Manufacturing Co., "Masterflex" Model MF-180EX-48"
2. Carsonite, "Super Duck II"
3. FlexStake, Surface Mount H-D

Channelizers

SURFACE MOUNT TYPE, 900 mm (36")

1. Bent Manufacturing Co., "Masterflex" Models MF-360-36 (Round) and MF-180-36" (Flat)
2. Carsonite, "Super Duck" (Flat SDF-436, Round SDR-336)
3. Carsonite, Super Duck II Model SDCF203601MB "The Channelizer"
4. Davidson Plastics, Flex-Guide FG300
5. FlexStake, Surface Mount H-D
6. GreenLine, Model SMD-36
7. Repo, Models 300 and 400
8. Safe-Hit, Guide Post, Model SH236SMA, with glue down base
9. The Line Connection, "Dura-Post" Model DP36-3 (Permanent)
10. The Line Connection, "Dura-Post" Model DP36-3C (Temporary)

Type K Object Markers, 450 mm (18")

1. Carsonite, Model SMD-615
2. Repo, Models 300 and 400
3. Safe-Hit, Model SH718SMA
4. The Line Connection, Model DP21-4K (Vertical configuration only)

Type K-4 Object Markers, 450-600 mm (18-24")(previously listed as "Q")

1. Carsonite, Super Duck II
2. Repo, Models 300 and 400
3. Safe-Hit, Models SH824SMA--WA and SH824GP3--WA
4. The Line Connection, Model "DP21-4Q"

Concrete Barrier Markers (For use to the left of traffic)

IMPACTABLE TYPE

1. Astro Optics "FB"
2. Davidson Plastics, Model PCBM-12
3. Duraflex Corp., "Flexx 2020" and "Electriflexx"

NON-IMPACTABLE TYPE

1. Astro-Optics, JD Series
2. Stimsonite, Model 967 (with 3 1/4" Acrylic cube corner reflector)
3. Stimsonite, Model 967LS (with Stimsonite Sheeting)
4. Vega Molded Products, Models GBM and JD

Thrie Beam Barrier Markers (For use to the left of traffic)

1. Duraflex Corp., "Railrider"
2. Davidson Plastics, "Mini" (3"x10")

Concrete Barrier Delineators, 400 mm (16") (For use to the right of traffic. When mounted on top of barrier, places top of reflective element at 48" [1200 mm])

1. Davidson Plastics, Model PCBM T-16
2. Safe-Hit, Model SH216RBM

Sound Wall Delineator (On vertical surface, places top of reflective element at 48" [1200 mm])

1. Davidson Plastics, PCBM S-36

Guard Railing Delineator, 685 mm (27") Wood Post Type (For use to the right or left of traffic. Places reflective element at 48" [1200 mm].)

1. Carsonite, Model 427
2. Davidson Plastics FG 427 and FG-527
3. GreenLine GRD 27-inch
4. Safe-Hit, Model SH227GRD

Guard Railing Delineator, 685 mm (27") Steel Post Type (For use to the right or left of traffic. Places reflective element at 48" [1200 mm].)

1. Carsonite, Model CFGR-327 with CFGRBK300 Mounting Bracket

Reflective Sheeting

CHANNELIZERS, BARRIER MARKERS AND DELINEATORS

1. 3M, High Intensity (Long Term)
2. Reflexite, PC-1000, Metalized Polycarbonate (Long Term)
3. Reflexite, AC-1000, Acrylic (Long Term)
4. Reflexite, AP-1000, Metalized Polyester (Short Term)
5. Reflexite, AR-1000, Abrasion Resistant Coating) (Short Term)
6. Stimsonite, Series 4500 (For rigid substrate devices only)

TRAFFIC CONES, 330 mm (13") Sleeves

1. Reflexite SB (Polyester), Vinyl or "TR" (Semi-transparent)

TRAFFIC CONES, 100 and 150 mm (4" and 6") Sleeves

1. 3M Series 3840
2. Reflexite Vinyl or "TR" (Semi-transparent)

BARRELS AND DRUMS

1. Reflexite, "Super High Intensity"
2. 3M Series 3810

BARRICADES, Type I, Engineer Grade

1. American Decal, Adcolite
2. Avery Dennison, 1500/1600
3. 3M, Scotchlite, Series CW

SIGNS (Sheeting Types conforming to the requirements of ASTM Designation: D 4956-93B)

1. Type II, Super Engineer Grade (State-Furnished Signs Only)
 - A. Avery Dennison, "Fasign" 2500 Series
 - B. Kiwalite, Type II
 - C. Nikkalite 1800 Series
2. Type III, High Performance
 - A. 3M, High Intensity, Series 3780

3. Type IV, High Performance
 - A. Stimsonite, Series 4200
4. Type VI, Roll-Up Signs
 - A. Reflexite, Vinyl

Sign Substrate for Construction Area Signs

1. Aluminum
2. Fiberglass Reinforced Plastic (FRP)
3. Sequentia, "Polyplate"
4. Fiber-Brite

8-1.03 SLAG AGGREGATE

Air-cooled iron blast furnace slag shall not be used to produce aggregate for:

1. Structure backfill material.
2. Pervious backfill material.
3. Permeable material.
4. Any reinforced or prestressed portland cement concrete component or structure.
5. Any nonreinforced portland cement concrete component or structure for which a Class 1 Surface Finish is required by the provisions in Section 51-1.18B, "Class 1 Surface Finish," of the Standard Specifications.

Aggregate produced from slag resulting from any steel-making process shall not be used for any highway construction except for the following items:

1. Imported Borrow
2. Aggregate Subbase
3. Class 2 Aggregate Base
4. Asphalt Concrete

Steel slag to be used to produce aggregate for aggregate subbase and Class 2 aggregate base shall be crushed so that 100 percent of the material will pass a 19-mm sieve and then shall be control aged for a period of at least 3 months under conditions that will maintain all portions of the stockpiled material at a moisture content in excess of 6 percent of the dry mass of the aggregate.

Any supplier of steel slag aggregate shall provide separate stockpiles for controlled aging of the slag. An individual stockpile shall contain not less than 9075 nor more than 45 350 tonnes of slag. The material in each individual stockpile shall be assigned a unique lot number and each stockpile shall be identified with a permanent system of signs. The supplier shall maintain a permanent record of the dates on which stockpiles are completed and controlled aging begun, of the dates when controlled aging was completed, and of the dates tests were made and the results of these tests. Moisture tests shall be made at least once per week. No credit for aging will be given for the time period covered by any tests which show a moisture content of 6 percent or less. The stockpiles and records shall be available to the Engineer during normal working hours for inspection, check testing and review.

The supplier shall notify RBF when each stockpile is completed and controlled aging begun. No more aggregate shall be added to the stockpile unless a new aging period is initiated. A further notification shall be sent when controlled aging is completed.

The supplier shall provide a Certificate of Compliance in conformance with the requirements in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications. Each stockpile or portion of a stockpile that is used in the work will be considered a lot. The Certificates of Compliance shall state that the steel slag aggregate has been aged in a stockpile for at least 3 months at a moisture content in excess of 6 percent of the dry mass of the aggregate.

Steel slag used for imported borrow shall be weathered for at least 3 months. Prior to the use of steel slag as imported borrow, the supplier shall furnish a Certificate of Compliance in conformance with the requirements in said Section 6-1.07. The Certificate of Compliance shall state that the steel slag has been weathered for at least 3 months.

Each delivery of aggregate containing steel slag for use as aggregate subbase or Class 2 aggregate base shall be accompanied by a delivery tag for each load which will identify the lot of material by stockpile number, where the slag was aged, and the date that the stockpile was completed and controlled aging begun.

Air-cooled iron blast furnace slag or natural aggregate may be blended in proper combinations with steel slag aggregate to produce the specified gradings, for those items for which steel slag aggregate is permitted, unless otherwise provided.

Aggregate containing slag shall meet all of the applicable quality requirements for the items in which the aggregate is used.

The combined slag aggregate shall conform to the specified grading for the item in which it is used. The grading will be determined by California Test 202, modified by California Test 105 when there is a difference in specific gravity of 0.2 or more between the coarse and fine portion of the aggregate or between blends of different aggregates.

No aggregate produced from slag shall be placed within 0.3-m, measured in any direction, of any non-cathodically protected pipe or structure unless the aggregate is incorporated in portland cement concrete pavement, in asphalt concrete, or in treated base.

When slag is used as aggregate in asphalt concrete, the K_C factor requirements, as determined by California Test 303, will not apply.

Slag aggregate used for embankment construction shall not be placed within 0.46-m of finished slope lines, measured normal to the plane of the slope.

If steel slag aggregates are used to make asphalt concrete, there shall be no other aggregates used in the mixture, except that up to 50 percent of the material passing the 4.75-mm sieve may consist of iron blast furnace slag aggregates or natural aggregates, or a combination thereof. If iron blast furnace aggregates or natural aggregates or a combination thereof are used in the mix, each type of aggregate shall be fed to the drier at a uniform rate. The rate of feed of each type of aggregate shall be maintained within 10 percent of the amount set. Adequate means shall be provided for controlling and checking the accuracy of the feeder.

In addition to the requirements of Section 39-3.01, "Storage," of the Standard Specifications, steel slag aggregate shall be stored separately from iron blast furnace slag aggregate and each type of slag aggregate shall also be stored separately from natural aggregate.

Asphalt concrete produced from more than one of the following shall not be placed in the same layer: steel slag aggregates; iron blast furnace slag aggregates; natural aggregates; or any combination thereof. Once a type of aggregate or aggregates is selected, it shall not be changed without prior approval by the Engineer.

If steel slag aggregates are used to produce asphalt concrete, and if the specific gravity of a compacted stabilometer test specimen is in excess of 2.40, the quantity of asphalt concrete to be paid for will be reduced. The stabilometer test specimen will be fabricated in accordance with the procedures in California Test 304 and the specific gravity of the specimen will be determined in accordance with Method C of California Test 308. The pay quantity of asphalt concrete will be determined by multiplying the quantity of asphalt concrete placed in the work by 2.40 and dividing the result by the specific gravity of the compacted stabilometer test specimen. Such reduction in quantity will be determined and applied as often as is necessary to ensure accurate results as determined by the Engineer.

SECTION 8-2. CONCRETE

8-2.01 PORTLAND CEMENT CONCRETE

Portland cement concrete shall conform to the provisions in Section 90, "Portland Cement Concrete," of the Standard Specifications and these special provisions.

Wherever the word "cement" is used in the Standard Specifications or the special provisions, and its use conforms to one of the following criteria, it shall be understood to mean "cementitious material":

- A. When the cement content of portland cement concrete is specified and Section 90, "Portland Cement Concrete," of the Standard Specifications is referenced.
- B. When the kilograms of cement per cubic meter for portland cement concrete is specified and Section 90, "Portland Cement Concrete," of the Standard Specifications is referenced.

The above criteria shall not apply when the use of mineral admixture is not allowed. Section 90-1.01, "Description," of the Standard Specifications is amended to read:

90-1.01 Description.—Portland cement concrete shall be composed of cementitious material, fine aggregate, coarse aggregate, admixtures if used, and water, proportioned and mixed as specified in these specifications.

Unless otherwise specified, cementitious material to be used in portland cement concrete shall conform to the requirements for cement and mineral admixtures in Section 90-2, "Materials" and shall be either: 1) "Type IP (MS) Modified" cement; or 2) a combination of "Type II Modified" portland cement and mineral admixture.

For precast, steam cured, or other high early strength concrete, mineral admixture will not be required if it has been determined by the Transportation Laboratory and documented in writing by the Engineer that the aggregate is from a source that is not alkali silica reactive.

Concrete for each portion of the work shall comply with the requirements for the Class, cementitious material content in kilograms per cubic meter, 28-day compressive strength, minor concrete, or commercial quality concrete, as shown on the plans or specified in these specifications or the special provisions.

Class 1 concrete shall contain not less than 400 kg of cementitious material per cubic meter.

Class 2 concrete shall contain not less than 350 kg of cementitious material per cubic meter.

Class 3 concrete shall contain not less than 300 kg of cementitious material per cubic meter.

Class 4 concrete shall contain not less than 250 kg of cementitious material per cubic meter.

Minor concrete shall contain not less than 325 kg of cementitious material per cubic meter unless otherwise specified in these specifications or the special provisions.

Unless otherwise designated on the plans or specified in these specifications or the special provisions, the amount of cementitious material used per cubic meter of concrete in structures or portions of structures shall conform to the following:

Use	Cementitious Material Content (kg/m ³)
Concrete which is designated by compressive strength:	
Deck slabs and slab spans of bridges	400 min., 475 max.
Roof sections of exposed top box culverts	400 min., 475 max.
Other portions of structures	350 min., 475 max.
Concrete not designated by compressive strength:	
Deck slabs and slab spans of bridges	400 min.
Roof sections of exposed top box culverts	400 min.
Prestressed members	400 min.
Seal cours	400 min.
Other portions of structures	350 min.

Whenever the 28-day compressive strength shown on the plans is 25 MPa or greater, the concrete shall be considered to be designated by compressive strength. If the plans show a 28-day compressive strength which is 31 MPa or greater, an additional 7 days will be allowed to obtain the specified strength. The 28-day compressive strengths shown on the plans which are less than 25 MPa, are shown for design information only and are not to be considered a requirement for acceptance of the concrete.

Concrete designated by compressive strength shall be proportioned such that the concrete will conform to the strength shown on the plans or specified in the special provisions.

The Contractor shall determine the mix proportions for all concrete except pavement concrete. The Engineer will determine the mix proportions for pavement concrete.

Before using concrete for which the mix proportions have been determined by the Contractor, or in advance of revising those mix proportions, the Contractor shall submit in writing to the Engineer a copy of the mix design.

Compliance with cementitious material content requirements will be verified in accordance with procedures described in California Test 518 for cement content. For testing purposes, mineral admixture shall be considered to be cement. Batch proportions shall be adjusted as necessary to produce concrete having the specified cementitious material content.

If any concrete used in the work has a cementitious material content, consisting of cement, mineral admixture, or cement plus mineral admixture, which is less than the minimum required for the work, the concrete shall be removed. However, if the Engineer determines that the concrete is structurally adequate, the concrete may remain in place and the Contractor shall pay to RBF \$0.55 for each kilogram of cement, mineral admixture, or cement plus mineral admixture which is less than the minimum required for the work. RBF may deduct the amount from any monies due, or that may become due, the Contractor under the contract. The deductions will not be made unless the difference between the contents required and those actually provided exceeds the batching tolerances permitted by Section 90-5, "Proportioning." No deductions for cementitious material content will be made based on the results of California Test 518.

The requirements of the preceding paragraph shall not apply to minor concrete nor commercial quality concrete.

All concrete for which the mix proportions are determined either by the Contractor or the Engineer shall conform to the requirements of this Section 90.

The first paragraph in Section 90-2.01, "Portland Cement," of the Standard Specifications is amended to read:

90-2.01 Portland Cement.—Unless otherwise specified, portland cement shall be either "Type IP (MS) Modified" cement or "Type II Modified" portland cement.

"Type IP (MS) Modified" cement shall conform to the specifications for Type IP (MS) cement in ASTM Designation: C 595, and shall be comprised of an intimate mixture of Type II cement and not more than 25 percent of a mineral admixture. The type and minimum amount of mineral admixture used in the manufacture of "Type IP (MS) Modified" cement shall be in accordance with the provisions of Section 90-4.08, "Required Use of Mineral Admixtures."

"Type II Modified" portland cement shall conform to the specifications for Type II portland cement in ASTM Designation: C 150.

In addition, "Type IP (MS) Modified" cement and "Type II Modified" portland cement shall conform to the following requirements:

- A. The cement shall not contain more than 0.60 percent by mass of alkalis, calculated as the percentage of Na_2O plus 0.658 times the percentage of K_2O , when determined by either direct intensity flame photometry or by the atomic absorption method. The instrument and procedure used shall be qualified as to precision and accuracy in accordance with the requirements of ASTM Designation: C 114.
- B. The autoclave expansion shall not exceed 0.50 percent.
- C. Mortar, containing the cement to be used and Ottawa sand, when tested in accordance with California Test 527, shall not expand in water more than 0.010 percent and shall not contract in air more than 0.048 percent except that when cement is to be used for precast prestressed concrete piling, precast prestressed concrete members or steam cured concrete products, the mortar shall not contract in air more than 0.053 percent.

The second paragraph in Section 90-2.01, "Portland Cement," of the Standard Specifications is amended to read:

Type III and Type V portland cements shall conform to the specifications in ASTM Designation: C 150, and the modifications listed above for Type II Modified portland cement, except that when tested in accordance with California Test 527, mortar containing Type III portland cement shall not contract in air more than 0.075 percent.

The third paragraph in Section 90-2.01, "Portland Cement," of the Standard Specifications is deleted.

The twelfth paragraph in Section 90-2.02, "Aggregates," of the Standard Specifications is deleted.

The first paragraph in Section 90-2.03, "Water," of the Standard Specifications is amended to read:

90-2.03 Water.—In conventionally reinforced concrete work, the water for curing, for washing aggregates, and for mixing shall be free from oil and shall not contain more than 1,000 parts per million of chlorides as Cl, nor more than 1,300 parts per million of sulfates as SO_4 . In prestressed concrete work, the water for curing, for washing aggregates, and for mixing shall be free from oil and shall not contain more than 650 parts per million of chlorides as Cl, nor more than 1,300 parts per million of sulfates as SO_4 . In no case shall the water contain an amount of impurities that will cause either: 1) a change in the setting time of cement of more than 25 percent when tested in accordance with ASTM Designation: C 191 or ASTM Designation: C 266; or 2) a reduction in the compressive strength of mortar at 14 days of more than 5 percent, when tested in accordance with ASTM Designation: C 109, when compared to the results obtained with distilled water or deionized water, tested in accordance with ASTM Designation: C 109.

The following section is added to Section 90-2, "Materials," of the Standard Specifications:

90-2.04 Admixture Materials.—Admixture materials shall conform to the requirements of the ASTM Designations shown below:

Chemical Admixtures—ASTM Designation: C 494.

Air-entraining Admixtures—ASTM Designation: C 260.

Calcium Chloride—ASTM Designation: D 98.

Mineral Admixtures—Coal fly ash, raw or calcined natural pozzolan as specified in ASTM Designation: C 618, except that the loss on ignition shall not exceed 4 percent, or, silica fume as specified in ASTM Designation: C 1240, with reduction of mortar expansion of 80 percent, minimum, using the cement from the proposed mix design.

Mineral admixtures shall be used in accordance with the provisions in Section 90-4.08, "Required Use of Mineral Admixtures."

Section 90-4.02, "Materials," of the Standard Specifications is amended to read:

90-4.02 Materials.—Admixture materials shall be as specified in Section 90-2.04, "Admixture Materials."

Section 90-4.05, "Optional Use of Chemical Admixtures," of the Standard Specifications is amended to read:

90-4.05 Optional Use of Chemical Admixtures.—The Contractor will be permitted to use Type A or F, water-reducing; Type B, retarding; or Type D or G, water-reducing and retarding admixtures as described in ASTM

Designation: C 494 to conserve cementitious material or to facilitate any concrete construction application subject to the following conditions:

When a water-reducing admixture or a water-reducing and retarding admixture is used, the cementitious material content specified or ordered may be reduced by a maximum of 5 percent by mass except that the resultant cementitious material content shall be not less than 300 kilograms per cubic meter.

When a reduction in cementitious material content is made, the dosage of admixture used shall be the dosage used in determining approval of the admixture.

Section 90-4.07, "Optional Use of Air-entraining Admixtures," of the Standard Specifications is amended to read:

90-4.07 Optional Use of Air-entraining Admixtures.—When air-entrainment has not been specified or ordered by the Engineer, the Contractor will be permitted to use an air-entraining admixture to facilitate the use of any construction procedure or equipment provided that the average air content, as determined by California Test 504, of 3 successive tests does not exceed 4 percent and no single test value exceeds 5.5 percent. If the Contractor elects to use an air-entraining admixture in concrete for pavement, the Contractor shall so indicate at the time the Contractor designates the source of aggregate as provided in Section 40-1.015, "Cement Content."

Section 90-4.08, "Required Use of Mineral Admixtures," of the Standard is amended to read:

90-4.08 Required Use of Mineral Admixtures.—Unless otherwise specified, mineral admixture shall be combined with cement to make cementitious material for use in portland cement concrete.

The calcium oxide content of mineral admixtures shall not exceed 10 percent and the alkali content as Na_2O shall not exceed 4 percent as determined by California Test 404.

The amounts of cement and mineral admixture used in cementitious material for portland cement concrete shall be sufficient to satisfy the minimum cementitious material content requirements specified in Section 90-1.01, "Description," or Section 90-4.05, "Optional Use of Chemical Admixtures," and shall conform to the following:

The minimum amount of cement shall not be less than 75 percent by mass of the specified minimum cementitious material content.

The minimum amount of mineral admixture to be combined with cement shall be determined using one of the following criteria:

- A. When the calcium oxide content of a mineral admixture, measured in conformance with the requirements of ASTM Designation: C 618 and Section 90-2.04, "Admixture Materials," is equal to or less than 2 percent by mass, the amount of mineral admixture shall not be less than 15 percent by mass of the total amount of cementitious material to be used in the mix.
- B. When the calcium oxide content of a mineral admixture, measured in conformance with the requirements of ASTM Designation: C 618 and Section 90-2.04, "Admixture Materials," is greater than 2 percent, the amount of mineral admixture shall not be less than 25 percent by mass of the total amount of cementitious material to be used in the mix.
- C. When a mineral admixture is used, which conforms to the requirements for silica fume in Section 90-2.04, "Admixture Materials," is used, the amount of mineral admixture shall not be less than 10 percent by mass of the total amount of cementitious material to be used in the mix.

If more than the required amount of cementitious material is used, the additional cementitious material in the mix may be either cement, mineral admixture or a combination of both; however, the maximum amount of mineral admixture shall not exceed 35 percent by mass of the total amount of cementitious material to be used in the mix. Where Section 90-1.01, "Description," specifies a maximum cementitious content in kilograms per cubic meter, the total mass of cement and mineral admixture per cubic meter shall not exceed the specified maximum cementitious material content.

Section 90-4.09, "Optional Use of Mineral Admixture," of the Standard Specifications is deleted.

Section 90-4.11, "Storage, Proportioning, and Dispensing of Mineral Admixtures," of the Standard Specifications is amended to read:

90-4.11 Storage, Proportioning, and Dispensing of Mineral Admixtures.—Mineral admixtures shall be protected from exposure to moisture until used. Sacked material shall be piled to permit access for tally, inspection and identification for each shipment.

Adequate facilities shall be provided to assure that mineral admixtures meeting the specified requirements are kept separate from other mineral admixtures in order to prevent any but the specified mineral admixtures from entering the work. Safe and suitable facilities for sampling mineral admixtures shall be provided at the weigh hopper or in the feed line immediately in advance of the hopper.

Mineral admixtures shall be incorporated into concrete using equipment conforming to the requirements for cement weigh hoppers, and charging and discharging mechanisms in ASTM Designation: C 94, in Section 90-5.03, "Proportioning," and in this Section 90-4.11.

When interlocks are required for cement and mineral admixture charging mechanisms by Section 90-5.03A, "Proportioning for Pavement," and cement and mineral admixtures are weighed cumulatively, their charging mechanisms shall be interlocked to prevent the introduction of mineral admixture until the mass of cement in the cement weigh hopper is within the tolerances specified in Section 90-5.02, "Proportioning Devices."

Mineral admixture used in concrete for exposed surfaces of like elements of a structure shall be from the same source and of the same percentage.

Section 90-5.02, "Proportioning Devices," of the Standard Specifications is amended to read:

90-5.02 Proportioning Devices.—All weighing, measuring or metering devices used for proportioning materials shall conform to the requirements in Section 9-1.01, "Measurement of Quantities," and this Section 90-5.02. In addition, any automatic weighing systems used shall comply with the requirements for automatic proportioning devices in Section 90-5.03A, "Proportioning for Pavement." These automatic devices shall be automatic to the extent that the only manual operation required for proportioning the aggregates, cement, and mineral admixture for one batch of concrete is a single operation of a switch or starter.

Proportioning devices shall be tested at the expense of the Contractor as frequently as the Engineer may deem necessary to insure their accuracy.

Weighing equipment shall be insulated against vibration or movement of other operating equipment in the plant. When the plant is in operation, the mass of each batch of material shall not vary from the mass designated by the Engineer by more than the tolerances specified herein.

Equipment for cumulative weighing of aggregate shall have a zero tolerance of ± 0.5 percent of the designated total batch mass of the aggregate. For systems with individual weigh hoppers for the various sizes of aggregate, the zero tolerance shall be ± 0.5 percent of the individual batch mass designated for each size of aggregate. Equipment for cumulative weighing of cement and mineral admixtures shall have a zero tolerance of ± 0.5 percent of the designated total batch mass of the cement and mineral admixture. Equipment for weighing cement or mineral admixture separately shall have a zero tolerance of ± 0.5 percent of their designated individual batch masses. Equipment for measuring water shall have a zero tolerance of ± 0.5 percent of its designated mass or volume.

The mass indicated for any batch of material shall not vary from the preselected scale setting by more than the following:

- A. Aggregate weighed cumulatively shall be within 1.0 percent of the designated total batch mass of the aggregate. Aggregates weighed individually shall be within 1.5 percent of their respective designated batch masses.
- B. Cement shall be within 1.0 percent of its designated batch mass. When weighed individually, mineral admixture shall be within 1.0 percent of its designated batch mass. When mineral admixture and cement are permitted to be weighed cumulatively, cement shall be weighed first to within 1.0 percent of its designated batch mass, and the total for cement and mineral admixture shall be within 1.0 percent of the sum of their designated batch masses.
- C. Water shall be within 1.5 percent of its designated mass or volume.

Each scale graduation shall be approximately 0.001 of the total capacity of the scale. The capacity of scales for weighing cement, mineral admixture, or cement plus mineral admixture and aggregates shall not exceed that of commercially available scales having single graduations indicating a mass not exceeding the maximum permissible mass variation above, except that no scale shall be required having a capacity of less than 500 kg, with 0.5 kg graduations.

Section 90-5.03, "Proportioning," of the Standard Specifications is amended to read:

90-5.03 Proportioning.—Proportioning shall consist of dividing the aggregates into the specified sizes, each stored in a separate bin, and combining them with cement, mineral admixture and water as provided in these specifications. Aggregates shall be proportioned by mass.

At the time of batching, all aggregates shall have been dried or drained sufficiently to result in a stable moisture content such that no visible separation of water from aggregate will take place during transportation from the proportioning plant to the point of mixing. In no event shall the free moisture content of the fine aggregate at the time of batching exceed 8 percent of its saturated, surface-dry mass.

Should separate supplies of aggregate material of the same size group, but of different moisture content or specific gravity or surface characteristics affecting workability, be available at the proportioning plant, withdrawals shall be made from one supply exclusively and the materials therein completely exhausted before starting upon another.

Bulk "Type IP (MS) Modified" cement, that conforms to the requirements in Section 90-2.01, "Portland Cement," shall be weighed in an individual hopper and shall be kept separate from the aggregates until the ingredients are released for discharge. Except as otherwise noted below, the cement hoppers may be attached to a separate scale for individual weighing. If the cement is weighed cumulatively, the cement shall be weighed before the other ingredients.

Bulk cement to be blended with mineral admixture for use in portland cement concrete for pavement and structures shall be proportioned by one of the following methods:

1. Bulk cement and mineral admixture shall be weighed in individual weigh-hoppers and shall be kept separate from each other and from the aggregates until the ingredients are released for discharge into the mixer. The weigh systems for the proportioning of the aggregate, the cement, and the mineral admixture shall be individual and distinct from all other weigh systems. Each weigh system shall be equipped with a hopper, a lever system, and a weight indicator to constitute an individual and independent material weighing device. The aggregate, the cement, and the mineral admixture shall be discharged into the mixer simultaneously.
2. Bulk cement and mineral admixture may be weighed in the same weigh hopper if the mix uniformity conform to the requirements of Annex "A1, Concrete Uniformity Requirements," of ASTM Designation: C 94 as tested by the Contractor. The capability of the mixing methods and devices shall be established before starting production of portland cement concrete for contract work. Mix uniformity sampling and testing shall be done in the presence of the Engineer. The Engineer shall approve the mixing methods and devices as a supplement to California Test 109. The time between tests for mix uniformity testing shall be the same as that required by California Test 109 for portland cement concrete batch plant scale calibration.

The scale and weigh hopper for bulk weighing cement, mineral admixture, and cement plus mineral admixture shall be separate and distinct from the aggregate weighing equipment.

When the source of any aggregate is changed for concrete structures, the Contractor shall adjust the mix proportions and submit in writing to the Engineer a copy of the mix design before using such aggregates. When the source of any aggregate is changed for other concrete, the Engineer shall be allowed sufficient time to adjust the mix and such aggregates shall not be used until necessary adjustments are made.

For all batches with a volume of one cubic meter or more, the batching equipment shall conform to one of the following combinations:

- A. Separate boxes and separate scale and indicator for weighing each size of aggregate.
- B. Single box and scale indicator for all aggregates.
- C. Single box or separate boxes and automatic weighing mechanism for all aggregates.

In order to check the accuracy of batch masses, the gross mass and tare mass of batch trucks, truck mixers, truck agitators, and non-agitating hauling equipment shall be determined when ordered by the Engineer. The equipment shall be weighed at the Contractor's expense on scales designated by the Engineer.

Section 90-5.03A, "Proportioning for Pavement," of the Standard Specifications is amended to read:

90-5.03A Proportioning for Pavement.—Aggregates and bulk cement, mineral admixture, and cement plus mineral admixture for use in pavement shall be proportioned by mass by means of automatic proportioning devices of approved type conforming to the requirements specified in this Section 90-5.03A.

The Contractor shall install and maintain in operating condition an electrically actuated moisture meter that will indicate, on a readily visible scale, changes in the moisture content of the fine aggregate as it is batched within a sensitivity of 0.5 percent by mass of the fine aggregate.

The batching of cement, mineral admixture, or cement plus mineral admixture and aggregate shall be interlocked so that a new batch cannot be started until all weigh hoppers are empty, the proportioning devices are within zero tolerance, and the discharge gates are closed. The interlock shall permit no part of the batch to be discharged until all aggregate hoppers and the cement and mineral admixture hoppers or the cement plus mineral admixture hopper are charged with masses which are within the tolerances specified in Section 90-5.02, "Proportioning Devices."

The discharge gate on the cement and mineral admixture hoppers or the cement plus mineral admixture hopper shall be designed to permit regulating the flow of cement, mineral admixture, or cement plus mineral admixture into the aggregate as directed by the Engineer.

When separate weigh boxes are used for each size of aggregate, the discharge gates shall permit regulating the flow of each size of aggregate as directed by the Engineer.

Material discharged from the several bins shall be controlled by gates or by mechanical conveyors. The means of withdrawal from the several bins, and of discharge from the weigh box, shall be interlocked so that not more than one bin can discharge at a time, and that the weigh box cannot be tripped until the required quantity from each of the several bins has been deposited therein. Should a separate weigh box be used for each size of aggregate, all may be operated and discharged simultaneously.

When the discharge from the several bins is controlled by gates, each gate shall be actuated automatically so that the required mass is discharged into the weigh box, after which the gate shall automatically close and lock.

The automatic weighing system shall be designed so that all proportions required may be set on the weighing controller at the same time.

The third paragraph in Section 90-6.01, "General," of the Standard Specifications is amended to read:

All concrete shall be homogeneous and thoroughly mixed, and there shall be no lumps or evidence of undispersed cement, mineral admixture, or cement plus mineral admixture.

The third and fourth paragraphs in Section 90-6.02, "Machine Mixing," of the Standard Specifications are amended to read:

The batch shall be so charged into the mixer that some water will enter in advance of cementitious materials and aggregates. All water shall be in the drum by the end of the first one-fourth of the specified mixing time.

Cementitious materials shall be batched and charged into the mixer by means that will not result either in loss of cementitious materials due to the effect of wind, or in accumulation of cementitious materials on surfaces of conveyors or hoppers, or in other conditions which reduce or vary the required quantity of cementitious material in the concrete mixture.

The sixth paragraph in Section 90-6.02, "Machine Mixing," of the Standard Specifications is amended to read:

The total elapsed time between the intermingling of damp aggregates and all cementitious materials and the start of mixing shall not exceed 30 minutes.

The seventh and eighth paragraphs in Section 90-6.03, "Transporting Mixed Concrete," of the Standard Specifications are amended to read:

When a truck mixer or agitator is used for transporting concrete to the delivery point, discharge shall be completed within 1.5 hours, or before 250 revolutions of the drum or blades, whichever comes first, after the introduction of the cement to the aggregates. Under conditions contributing to quick stiffening of the concrete, or when the temperature of the concrete is 30° C, or above, a time less than 1.5 hours may be required.

When non-agitating hauling equipment is used for transporting concrete to the delivery point, discharge shall be completed within one hour after the addition of the cement to the aggregates. Under conditions contributing to quick stiffening of the concrete, or when the temperature of the concrete is 30° C, or above, the time between the introduction of cement to the aggregates and discharge shall not exceed 45 minutes.

The ninth and tenth paragraphs in Section 90-6.03, "Transporting Mixed Concrete," of the Standard Specifications are amended to read:

Each load of concrete delivered at the jobsite shall be accompanied by a ticket showing the mix identification number, non-repeating load number, date and time at which the materials were batched, the total amount of water (liters) added to the load and for transit-mixed concrete, the reading of the revolution counter at the time the truck mixer is charged with cement. This ticket shall also show the actual scale masses (kilograms) for the ingredients batched or the calculated portland cement concrete volume (cubic meters) calculated from actual scale masses. Theoretical or target batch masses shall not be used as a substitute for actual scale. When showing a calculated portland cement concrete volume on the delivery ticket, the Contractor shall maintain and have available a record of the following information for each batched load:

1. Mix identification number, specific to the contract.
2. Load number shall match the load number on the delivery ticket.
3. Date and time the load was batched.
4. Actual batch mass (kilograms) for each ingredient.
5. Any water (liters) added at the plant, in addition to the water proportioned for the batch.

When requested, the Contractor shall submit the recorded information for calculated portland cement concrete volumes to the Engineer. The information shall be provided in printed form, or if acceptable to the Engineer, data may be submitted in electronic media. Electronic media shall be presented in a tab delimited format on 90 mm diskette with a capacity of at least 1.4 megabytes. Captured data, for the ingredients represented by each batch shall be LFCR (one line, separate record) with allowances for sufficient fields to satisfy the amount of data required by these specifications.

Section 90-6.05, "Hand-Mixing," of the Standard Specifications is amended to read:

90-6.05 Hand-Mixing.—Hand-mixed concrete shall be made in batches not more than one-fourth cubic meter and shall be mixed on a watertight, level platform. The proper amount of coarse aggregate shall be measured in measuring boxes and spread on the platform and the fine aggregate shall be spread on this layer, the 2 layers being not more than 0.3 meters in total depth. On this mixture shall be spread the dry cement and mineral admixture and the whole mass turned no fewer than 2 times dry; then sufficient clean water shall be added, evenly distributed, and the whole mass again turned no fewer than 3 times, not including placing in the carriers or forms.

The table in the first paragraph in Section 90-6.06, "Amount of Water and Penetration," of the Standard Specifications is amended to read:

Type of Work	Nominal Penetration (mm)	Maximum Penetration (mm)
Concrete pavement	0-25	40
Non-reinforced concrete facilities	0-35	50
Reinforced concrete structures:		
Sections over 300 mm thick	0-35	65
Sections 300 mm thick or less	0-50	75
Concrete placed under water	75-100	115
Cast-in-place concrete piles	65-90	100

The second paragraph in Section 90-6.06, "Amount of Water and Penetration," of the Standard Specifications is amended to read:

The amount of free water used in concrete shall not exceed 180 kilograms per cubic meter, plus 20 kilograms for each required 100 kilograms of cementitious material in excess of 325 kilograms per cubic meter.

The fourth paragraph in Section 90-6.06, "Amount of Water and Penetration," of the Standard Specifications is amended to read:

Where there are adverse or difficult conditions which affect the placing of concrete, the above specified penetration and free water content limitations may be exceeded providing the Contractor is granted permission by the Engineer in writing to increase the cementitious material content per cubic meter of concrete. The increase in water and cementitious material shall be at a ratio not to exceed 30 kg of water per added 100 kg of cementitious material per cubic meter. The cost of additional cementitious material and water added under these conditions shall be at the Contractor's expense and no additional compensation will be allowed therefor.

Section 90-9.01, "General," of the Standard Specifications is amended to read:

90-9.01 General.—Concrete compressive strength requirements consist of a minimum strength which must be attained before various loads or stresses are applied to the concrete and, for concrete designated by strength, a minimum strength at the age of 28 days or at the age otherwise allowed in Section 90-1.01, "Description." The various strengths required are specified elsewhere or are shown on the plans.

The compressive strength of concrete will be determined from test cylinders which have been fabricated from concrete sampled in accordance with California Test 539. Test cylinders will be molded and initial field cured in accordance with California Test 540. Test cylinders will be cured and tested after receipt at the testing laboratory in accordance with California Test 521. A strength test shall consist of the average strength of 2 cylinders fabricated from material taken from a single load of concrete, except that, if any cylinder should show evidence of improper sampling, molding, or testing, that cylinder shall be discarded and the strength test shall consist of the strength of the remaining cylinder.

When concrete compressive strength is specified as a prerequisite to applying loads or stresses to a concrete structure or member, test cylinders for other than steam cured concrete will be cured in accordance with Method 1 of California Test 540. The compressive strength of concrete determined for these purposes will be evaluated on the basis of individual tests.

When concrete is designated by 28-day compressive strength rather than by cementitious material content, the concrete strength to be used as a basis for acceptance of other than steam cured concrete will be determined from cylinders cured in conformance with Method 1 of California Test 540. If the result of a single compressive strength test at the maximum age specified or allowed is below the specified strength but is 95 percent or more of the

specified strength, the Contractor shall, at the Contractor's expense, make corrective changes, subject to approval of the Engineer, in the mix proportions or in the concrete fabrication procedures, before placing additional concrete, and shall pay to RBF \$14.00 for each in-place cubic meter of concrete represented by the deficient test. If the result of a single compressive strength test at the maximum age specified or allowed is below 95 percent of the specified strength, but is 85 percent or more of the specified strength, the Contractor shall make the corrective changes specified above, and shall pay to RBF \$20.00 for each in place cubic meter of concrete represented by the deficient test. In addition, such corrective changes shall be made when the compressive strength of concrete tested at 7 days indicates, in the judgment of the Engineer, that the concrete will not attain the required compressive strength at the maximum age specified or allowed. All concrete represented by a single test which indicates a compressive strength of less than 85 percent of the specified 28-day compressive strength will be rejected in accordance with the provisions in Section 6-1.04, "Defective Materials."

If the test result indicates that the compressive strength at the maximum curing age specified or allowed is below the specified strength, but 85 percent or more of the specified strength, payments to RBF as required above shall be made, unless the Contractor, at the Contractor's expense, obtains and submits evidence acceptable to the Engineer that the strength of the concrete placed in the work meets or exceeds the specified 28-day compressive strength. If the test result indicates a compressive strength at the maximum curing age specified or allowed below 85 percent, the concrete represented by that test will be rejected, unless the Contractor, at the Contractor's expense, obtains and submits evidence acceptable to the Engineer that the strength and quality of the concrete placed in the work are acceptable. If the evidence consists of tests made on cores taken from the work, the cores shall be obtained and tested in accordance with the specifications of ASTM Designation: C 42.

No single compressive strength test shall represent more than 250 cubic meters.

When a precast concrete member is steam cured, the compressive strength of the concrete will be determined from test cylinders which have been handled and stored in accordance with Method 3 of California Test 540. The compressive strength of steam cured concrete will be evaluated on the basis of individual tests representing specific portions of production. When the concrete is designated by 28-day compressive strength rather than by cementitious material content, the concrete shall be considered to be acceptable whenever its compressive strength reaches the specified 28-day compressive strength provided that strength is reached in not more than the maximum number of days specified or allowed after the member is cast.

When concrete is specified by compressive strength, prequalification of materials, mix proportions, mixing equipment, and procedures proposed for use, will be required prior to placement of the concrete. Prequalification shall be accomplished by the submission of acceptable certified test data or trial batch reports by the Contractor. Prequalification data shall be based on the use of materials, mix proportions, mixing equipment, procedures, and size of batch proposed for use in the work.

Certified test data, in order to be acceptable, must indicate that not less than 90 percent of at least 20 consecutive tests exceed the specified strength at the maximum number of cure days specified or allowed, and none of those tests are less than 95 percent of specified strength. Strength tests included in the data shall be the most recent tests made on concrete of the proposed mix design and all shall have been made within one year of the proposed use of the concrete.

Trial batch test reports, in order to be acceptable, must indicate that the average compressive strength of 5 consecutive concrete cylinders, taken from a single batch, at not more than 28 days (or the maximum age allowed) after molding shall be at least 4 MPa greater than the specified 28-day day compressive strength, and no individual cylinder shall have a strength less than the specified strength at the maximum age specified or allowed. Data contained in the report shall be from trial batches which were produced within one year of the proposed use of specified strength concrete in the project. Whenever air-entrainment is required, the air content of trial batches shall be equal to or greater than the air content specified for the concrete without reduction due to tolerances.

All tests shall be performed in accordance with either the appropriate California Test methods or the comparable ASTM test methods. All equipment employed in testing shall be in good condition and shall be properly calibrated. If the tests are performed during the life of the contract, the Engineer shall be notified sufficiently in advance of performing the tests in order to witness the test procedures.

The certified test data and trial batch test reports shall include the following information:

- A. Date of mixing.
- B. Mixing equipment and procedures used.
- C. The size of batch in cubic meters and the mass, type and source of all ingredients used.
- D. Penetration of the concrete.
- E. The air content of the concrete if an air-entraining admixture is used.
- F. The age at time of testing and strength of all concrete cylinders tested.

All certified test data and trial batch test reports shall be signed by an official of the firm which performed the tests.

When approved by the Engineer, concrete from trial batches may be used in the work at locations where concrete of a lower quality is required and the concrete will be paid for as the type or class of concrete required at that location.

After materials, mix proportions, mixing equipment, and procedures for concrete have been prequalified for use, additional prequalification by testing of trial batches will be required prior to making any changes which, in the judgment of the Engineer, could result in a lowering of the strength of the concrete below that specified.

The Contractor's attention is directed to the time required to test trial batches and the Contractor shall be responsible for production of trial batches at a sufficiently early date so that the progress of the work is not delayed.

When precast concrete members are manufactured at the plant of an established manufacturer of precast concrete members, the mix proportions of the concrete shall be determined by the Contractor, and a trial batch and prequalification of the materials, mix proportions, mixing equipment, and procedures will not be required.

Section 90-10.02A, "Portland Cement," of the Standard Specifications is renamed "Cementitious Material" and is amended to read:

90-10.02A Cementitious Material.—Cementitious material shall conform to the provisions in Section 90-1.01, "Description." Compressive strength requirements consist of a minimum strength which must be attained before various loads or stresses are applied to the concrete and, for concrete designated by strength, a minimum strength at the age of 28 days or at the age otherwise allowed in Section 90-1.01, "Description." The various strengths required are specified elsewhere or are shown on the plans.

The fifth paragraph in Section 90-10.02B, "Aggregate," of the Standard Specifications is deleted.
Section 90-10.03, "Production," of the Standard Specifications is amended to read:

Cementitious material, water, aggregate, and admixtures shall be stored, proportioned, mixed, transported, and discharged in conformance with recognized standards of good practice, which will result in concrete that is thoroughly and uniformly mixed, that is suitable for the use intended, and which conforms to requirements specified herein. "Recognized standards of good practice" are outlined in various industry publications such as are issued by American Concrete Institute, AASHTO, or California Department of Transportation.

The cementitious material content of minor concrete shall conform to the provisions in Section 90-1.01, "Description."

The amount of water used shall result in a consistency of concrete conforming to the provisions in Section 90-6.06, "Amount of Water and Penetration." Additional mixing water shall not be incorporated into the concrete during hauling or after arrival at the delivery point, unless authorized by the Engineer.

Discharge of ready-mixed concrete from the transporting vehicle shall be made while the concrete is still plastic and before any stiffening occurs. An elapsed time of 1.5 hours (one hour in non-agitating hauling equipment), or more than 250 revolutions of the drum or blades, after the introduction of the cementitious material to the aggregates, or a temperature of concrete of more than 32° C. will be considered as conditions contributing to the quick stiffening of concrete. The Contractor shall take whatever action is necessary to eliminate quick stiffening, except that the addition of water will not be permitted.

The required mixing time in stationary mixers shall be not less than 50 seconds nor more than 5 minutes.

The minimum required revolutions at mixing speed for transit-mixed concrete shall be not less than that recommended by the mixer manufacturer, and shall be increased, if necessary, to produce thoroughly and uniformly mixed concrete.

Each load of ready-mixed concrete shall be accompanied by a ticket which shall be delivered to the Engineer at the discharge location of the concrete, unless otherwise directed by the Engineer. The ticket shall be clearly marked with the date and time of day when the load left the batching plant and, if hauled in truck mixers or agitators, the time the mixing cycle started.

A Certificate of Compliance in accordance with the provisions in Section 6-1.07, "Certificates of Compliance," shall be furnished to the Engineer, prior to placing minor concrete from a source not previously used on the contract, stating that minor concrete to be furnished meets all contract requirements, including minimum cementitious material content specified.

The third and fourth paragraphs in Section 90-11.02, "Payment," of the Standard Specifications are amended to read:

Should the Engineer order the Contractor to incorporate any admixtures in the concrete when their use is not required by these specifications or the special provisions, furnishing the admixtures and adding them to the concrete will be paid for as extra work as provided in Section 4-1.03D.

Should the Contractor use admixtures as permitted under Sections 90-4.05, "Optional Use of Chemical Admixtures;" or 90-4.07, "Optional Use of Air-entraining Admixtures;" or should the Contractor request and obtain permission to use other admixtures for the Contractor's benefit, the Contractor shall furnish those admixtures and incorporate them in the concrete at the Contractor's expense and no additional compensation will be allowed therefor.

8-2.02 CEMENT AND WATER CONTENT

Except for concrete listed below, all concrete which is designated as Class 2 and all concrete for use in structures shall contain not less than 375 kg of cement per cubic meter and shall be air-entrained as provided in Section 90-4, "Admixtures," of the Standard Specifications. The air content at time of mixing and prior to placing shall be 3 percent \pm one percent.

1. Paving concrete.
2. Concrete designated by 28-day compressive strength.
3. Concrete designated as Class 1 or by a cement content which exceeds 375 kg/m³.
4. Seal course concrete.
5. Concrete for deck slabs of bridges and structure approach slabs.
6. Concrete for piling.

Except for concrete for deck slabs of bridges and structure approach slabs, the amount of free water used in concrete shall not exceed 204 kg/m³, plus 20 kg for each required 100 kg of cement in excess of 375 kg/m³.

The amount of free water used in concrete for deck slabs of bridges and structure approach slabs shall not exceed 186 kg/m³, plus 20 kg for each required 100 kg of cement in excess of 400 kg/m³.

SECTION 8-3. WELDING

8-3.01 WELDING ELECTRODES

Flux core welding electrodes conforming to the requirements of AWS A5.20 E6XT-4 or E7XT-4 shall not be used to perform any type of welding for this project.

8-3.02 WELDING QUALITY CONTROL

Welding quality control shall apply to the items of work described herein and shall conform to the requirements in the AWS welding codes, the Standard Specifications and these special provisions.

Wherever reference is made to the following AWS welding codes in the Standard Specifications, on the plans or in these special provisions, the year of adoption for these codes shall be as listed:

WS Code	Year of Adoption
D1.1	1996
D1.4	1992
D1.5	1995
D1.5 (metric only)	1996

SECTION 9. (BLANK)

SECTION 10. CONSTRUCTION DETAILS

SECTION 10-1. GENERAL

10-1.01 ORDER OF WORK

Order of work shall conform to the provisions in Section 5-1.05, "Order of Work," of the Standard Specifications and these special provisions.

At locations exposed to public traffic where guard railings or barriers are to be constructed, reconstructed, or removed and replaced, the Contractor shall schedule the operations so that at the end of each working day there shall be no post holes open nor shall there be any railing or barrier posts installed without the blocks and rail elements assembled and mounted thereon.

10-1.02 WATER POLLUTION CONTROL

Water pollution control work shall conform to the requirements in Section 7-1.01G, "Water Pollution," of the Standard Specifications, and these special provisions.

Water pollution control work shall conform to the requirements in the Construction Contractor's Guide and Specifications of the Caltrans Storm Water Quality Handbooks, dated April 1997, and addenda thereto issued up to and including the date of advertisement of the project, hereafter referred to as the "Handbook." Copies of the Handbook may be obtained from the Department of Transportation, Material Operations Branch, Publication Distribution Unit, 1900 Royal Oaks Drive, Sacramento, California 95815, Telephone: (916) 445-3520.

Copies of the Handbook are also available for review at Caltrans District Office, District Construction Office Administration, 2829 Juan Street, San Diego, CA 92110.

The Contractor shall become fully informed of, and comply with the applicable provisions of the Handbook and Federal, State and local regulations that govern the Contractor's operations and storm water discharges from both the project site and areas of disturbance outside the project limits during construction.

Unless arrangements for disturbance of areas outside the project limits are made by RBF and made part of the contract, it is expressly agreed that RBF assumes no responsibility to the Contractor or property owner whatsoever with respect to any arrangements made between the Contractor and property owner to allow disturbance of areas outside the project limits.

The Contractor shall be responsible for the costs and for any liability imposed by law as a result of the Contractor's failure to comply with the requirements set forth in this section "Water Pollution Control" including, but not limited to, compliance with the applicable provisions of the Handbook and Federal, State and local regulations. For the purposes of this paragraph, costs and liabilities include but are not limited to fines, penalties and damages whether assessed against RBF or the Contractor, including those levied under the Federal Clean Water Act and the State Porter Cologne Water Quality Act.

In addition to any remedy authorized by law, so much of the money due the Contractor under the contract that shall be considered necessary by RBF may be retained by RBF until disposition has been made of the costs and liabilities.

The retention of money due the Contractor shall be subject to the following:

1. RBF will give the Contractor 30 days notice of its intention to retain funds from any partial payment which may become due to the Contractor prior to acceptance of the contract. Retention of funds from any payment made after acceptance of the contract may be made without prior notice to the Contractor.
2. No retention of additional amounts out of partial payments will be made if the amount to be retained does not exceed the amount being withheld from partial payments pursuant to Section 9-1.06, "Partial Payments," of the Standard Specifications.
3. If RBF has retained funds and it is subsequently determined that RBF is not subject to the costs and liabilities in connection with the matter for which the retention was made, RBF shall be liable for interest on the amount retained at the legal rate of interest for the period of the retention.

Conformance with the requirements of this section "Water Pollution Control," shall not relieve the Contractor from the Contractor's responsibilities, as provided in Section 7-1.11, "Preservation of Property," and Section 7-1.12, "Responsibility for Damage," of the Standard Specifications.

WATER POLLUTION CONTROL PROGRAM PREPARATION, APPROVAL AND UPDATES.—As part of the water pollution control work, a Water Pollution Control Program, hereafter referred to as the "WPCP," is required for this contract. The WPCP shall conform to the requirements in Section 7-1.01G, "Water Pollution," of the Standard Specifications, the requirements in the Handbook, and these special provisions.

No work having potential to cause water pollution, as determined by the Engineer, shall be performed until the WPCP has been approved by the Engineer.

Within 20 days after the approval of the contract, the Contractor shall submit 3 copies of the WPCP to the Engineer. The Contractor shall allow 7 days for the Engineer to review the WPCP. If revisions are required, as determined by the Engineer, the Contractor shall revise and resubmit the WPCP within 7 days of receipt of the Engineer's comments and shall allow 7 days for the Engineer to review the revisions. Upon the Engineer's approval of the WPCP, 3 additional copies of the WPCP incorporating the required changes shall be submitted to the Engineer. Minor changes or clarifications to the initial submittal may be made and attached as amendments to the WPCP. In order to allow construction activities to proceed, the Engineer may conditionally approve the WPCP while minor revisions or amendments are being completed.

The objectives of the WPCP shall be to identify pollution sources that may adversely affect the quality of storm water discharges associated with the project and to identify, construct, implement and maintain water pollution control measures, hereafter referred to as control measures, to reduce to the extent feasible pollutants in storm water discharges from the construction site during construction under this contract.

The WPCP shall incorporate control measures in the following categories:

1. Soil stabilization practices;
2. Sediment control practices;
3. Sediment tracking control practices;
4. Wind erosion control practices; and
5. Nonstorm water management and waste management and disposal control practices.

Specific objectives and minimum requirements for each category of control measures are contained in the Handbook.

The Contractor shall consider the objectives and minimum requirements presented in the Handbook for each of the above categories. When minimum requirements are listed for any category, the Contractor shall incorporate into the WPCP and implement on the project, one or more of the listed minimum controls required in order to meet the pollution control objectives for the category. In addition, the Contractor shall consider other control measures presented in the Handbook and shall incorporate into the WPCP and implement on the project the control measures necessary to meet the objectives of the WPCP. The Contractor shall document the selection process in accordance with the procedure specified in the Handbook.

The WPCP shall include, but not be limited to, the following items as described in the Handbook:

1. Project description and Contractor's certification;
2. Project information;
3. Pollution sources, control measures, and water pollution control drawings; and
4. Amendments, if any.

The Contractor shall amend the WPCP, graphically and in narrative form, whenever there is a change in construction activities or operations which may affect the discharge of significant quantities of pollutants to surface waters, ground waters, municipal storm drain systems, or when deemed necessary by the Engineer. The WPCP shall also be amended if the WPCP has not achieved the objective of reducing pollutants in storm water discharges. Amendments shall show additional control measures or revised operations, including those in areas not shown in the initially approved WPCP, which are required on the project to control water pollution effectively. Amendments to the WPCP shall be submitted for review and approval by the Engineer in the same manner specified for the initially approved WPCP. Amendments shall be dated and attached to the on-site WPCP document.

The Contractor shall keep a copy of the WPCP, together with updates, revisions and amendments at the project site.

WPCP IMPLEMENTATION.—Upon approval of the WPCP, the Contractor shall be responsible throughout the duration of the project for installing, constructing, inspecting and maintaining the control measures included in the WPCP and any amendments thereto and for removing and disposing of temporary control measures. Unless otherwise directed by the Engineer or specified in these special provisions, the Contractor's responsibility for WPCP implementation shall continue throughout any temporary suspension of work ordered in accordance with Section 8-1.05, "Temporary Suspension of Work," of the Standard Specifications. Requirements for installation, construction, inspection, maintenance, removal and disposal of control measures are specified in the Handbook and these special provisions.

Soil stabilization practices and sediment control measures, including minimum requirements, shall be provided throughout the winter season, defined as ~~between being~~ November 1 ~~through and~~ March 30.

Implementation of soil stabilization practices and sediment control measures for soil-disturbed areas of the project site shall be completed, except as provided for below, no later than 20 days prior to the beginning of the winter season or upon start of applicable construction activities for projects which begin either during or within 20 days of the winter season.

Throughout the winter season, the active, soil-disturbed area of the project site shall be no more than 2 hectares. The Engineer may approve, on a case-by-case basis, expansions of the active, soil-disturbed area limit. The Contractor shall demonstrate the ability and preparedness to fully deploy soil stabilization practices and sediment control measures to protect soil-disturbed areas of the project site before the onset of precipitation. The Contractor shall maintain a quantity of soil stabilization and sediment control materials on site equal to 125 percent of that sufficient to protect unprotected, soil-disturbed areas on the project site and shall maintain a detailed plan for the mobilization of sufficient labor and equipment to fully deploy control measures required to protect unprotected, soil-disturbed areas on the project site prior to the onset of precipitation. The Contractor shall include a current inventory of control measure materials and the detailed mobilization plan as part of the WPCP.

Throughout the winter season, soil-disturbed areas of the project site shall be considered to be nonactive whenever soil disturbing activities are expected to be discontinued for a period of 20 or more days and the areas are fully protected. Areas that will become nonactive either during the winter season or within 20 days thereof shall be fully protected with soil stabilization practices and sediment control measures within 10 days of the discontinuance of soil disturbing activities or prior to the onset of precipitation, whichever is first to occur.

Throughout the winter season, active soil-disturbed areas of the project site shall be fully protected at the end of each day with soil stabilization practices and sediment control measures unless fair weather is predicted through the following work day. The weather forecast shall be monitored by the Contractor on a daily basis. The National Weather Service forecast shall be used, or an alternative weather forecast proposed by the Contractor may be used if approved by the Engineer. If precipitation is predicted prior to the end of the following work day, construction scheduling shall be modified, as required, and the Contractor shall deploy functioning control measures prior to the onset of the precipitation.

The Contractor shall implement, year-round and throughout the duration of the project, control measures included in the WPCP for sediment tracking, wind erosion, nonstorm water management and waste management and disposal.

The Engineer may order the suspension of construction operations which create water pollution if the Contractor fails to conform to the requirements of this section "Water Pollution Control" as determined by the Engineer.

MAINTENANCE.—To ensure the proper implementation and functioning of control measures, the Contractor shall regularly inspect and maintain the construction site for the control measures identified in the WPCP. The Contractor shall identify corrective actions and time frames to address any deficient measures or reinstate any measures that have been discontinued.

The construction site inspection checklist provided in the Handbook shall be used to ensure that the necessary measures are being properly implemented, and to ensure that the control measures are functioning adequately. The Contractor shall submit one copy of each site inspection record to the Engineer.

During the winter season, inspections of the construction site shall be conducted by the Contractor to identify deficient measures, as follows:

1. Prior to a forecast storm;
2. After all precipitation which causes runoff capable of carrying sediment from the construction site;
3. At 24 hour intervals during extended precipitation events; and
4. Routinely, at a minimum of once every 2 weeks.

If the Contractor or the Engineer identifies a deficiency in the deployment or functioning of an identified control measure, the deficiency shall be corrected by the Contractor immediately, or by a later date and time if requested by the Contractor and approved by the Engineer in writing, but not later than the onset of subsequent precipitation events. The correction of deficiencies shall be at no additional cost to RBF.

PAYMENT.—Full compensation for conforming to the requirements of this section shall be considered as included in the prices paid for the various contract items of work involved and no additional compensation will be allowed therefor.

Those control measures which are shown on the project plans and for which there is a contract item of work will be measured and paid for as that item of work.

The Engineer will retain an amount equal to 25 percent of the estimated value of the contract work performed during estimate periods in which the Contractor fails to conform to the requirements of this section "Water Pollution Control" as determined by the Engineer.

Retentions for failure to conform to the requirements of this section "Water Pollution Control" shall be in addition to the other retentions provided for in the contract. The amounts retained for failure of the Contractor to conform to the requirements of this section will be released for payment on the next monthly estimate for partial payment following the date that a WPCP has been implemented and maintained, and water pollution is adequately controlled, as determined by the Engineer.

10-1.03 PRESERVATION OF PROPERTY

Attention is directed to the provisions in Section 7-1.11, "Preservation of Property," of the Standard Specifications and these special provisions.

Existing trees, shrubs and other plants, that are not to be removed as shown on the plans or specified elsewhere in these special provisions or as directed by the Engineer, and are injured or damaged by reason of the Contractor's operations, shall be replaced by the Contractor. The minimum size of tree replacement shall be 915 mm box and the minimum size of shrub replacement shall be No. 15 container. Replacement ground cover plants shall be from flats and shall be planted 300 mm on center. Replacement of *Carpobrotus* ground cover plants shall be from cuttings and shall be planted 300 mm on center. Replacement planting shall conform to the requirements in Section 20-4.07, "Replacement," of the Standard Specifications.

Damaged or injured plants shall be removed and disposed of outside the highway right of way in accordance with the provisions in Section 7-1.13 of the Standard Specifications. At the option of the Contractor, removed trees and shrubs may be reduced to chips. The chipped material shall be spread within the highway right of way at locations designated by the Engineer.

Replacement planting of injured or damaged trees, shrubs and other plants shall be completed not less than 20 working days prior to acceptance of the contract. Replacement plants shall be watered as necessary to maintain the plants in a healthy condition.

10-1.04 PROGRESS SCHEDULE

Progress schedules will be required for this contract and shall conform to the provisions in Section 8-1.04, "Progress Schedule," of the Standard Specifications.

The progress schedule shall be submitted within 15 working days of approval of the contract to the Engineer.

10-1.05 OBSTRUCTIONS

Attention is directed to Sections 8-1.10, "Utility and Non-Highway Facilities," and 15, "Existing Highway Facilities," of the Standard Specifications and these special provisions.

The Contractor shall notify the Engineer and the appropriate regional notification center for operators of subsurface installations at least 2 working days, but not more than 14 calendar days, prior to performing any excavation or other work close to any underground pipeline, conduit, duct, wire or other structure. Regional notification centers include but are not limited to the following:

Notification Center	Telephone Number
Underground Service Alert-Northern California (USA)	1-800-642-2444 1-800-227-2600
Underground Service Alert-Southern California (USA)	1-800-422-4133 1-800-227-2600

10-1.06 MOBILIZATION

Mobilization shall conform to the provisions in Section 11, "Mobilization," of the Standard Specifications.

10-1.07 MAINTAINING TRAFFIC

Attention is directed to Sections 7-1.08, "Public Convenience," 7-1.09, "Public Safety," and 12, "Construction Area Traffic Control Devices," of the Standard Specifications and to the Section entitled "Public Safety" elsewhere in these special provisions, and these special provisions. Nothing in these special provisions shall be construed as relieving the Contractor from the responsibilities specified in Section 7-1.09.

No work that would require a lane closure shall be performed, except for temporary lane closures required to install temporary k-rail.

Whenever vehicles or equipment are parked on the shoulder within 1.8 m of a traffic lane, the shoulder area shall be closed with fluorescent traffic cones or portable delineators placed on a taper in advance of the parked vehicles or equipment and along the edge of the pavement at 7.5 m intervals to a point not less than 7.5 m past the last vehicle or piece of equipment. A minimum of 9 cones or portable delineators shall be used for the taper. A C23 (Road Work Ahead) or C24 (Shoulder Work Ahead) sign shall be mounted on a portable sign stand with flags. The sign shall be placed where directed by the Engineer.

Minor deviations from the requirements of this section concerning hours of work which do not significantly change the cost of the work may be permitted upon the written request of the Contractor if in the opinion of the Engineer, public traffic will be better served and the work expedited. These deviations shall not be adopted by the Contractor until the Engineer has approved them in writing. All other modifications will be made by contract change order.

10-1.08 TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE

A traffic control system shall consist of closing traffic lanes and ramps in accordance with the details shown on the plans, the provisions of Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications, the provisions under "Maintaining Traffic" and "Construction Area Signs" elsewhere in these special provisions and these special provisions.

The provisions in this section will not relieve the Contractor from the responsibility to provide additional devices or take the measures as may be necessary to comply with the provisions in Section 7-1.09, "Public Safety," of the Standard Specifications.

During traffic stripe operations and pavement marker placement operations using bituminous adhesive, traffic shall be controlled, at the option of the Contractor, with either stationary or moving type lane closures. During all other operations traffic shall be controlled with stationary type lane closures. The Contractor's attention is directed to the provisions in Section 84-1.04, "Protection From Damage," and Section 85-1.06, "Placement," of the Standard Specifications.

If any component in the traffic control system is displaced, or ceases to operate or function as specified, from any cause, during the progress of the work, the Contractor shall immediately repair the component to its original condition or replace the component and shall restore the component to its original location.

STATIONARY TYPE LANE CLOSURE.—When lane and ramp closures are made for work periods only, at the end of each work period, all components of the traffic control system, except portable delineators placed along open trenches or excavation adjacent to the traveled way, shall be removed from the traveled way and shoulder. If the Contractor so elects, the components may be stored at selected central locations, approved by the Engineer, within the limits of the highway right of way.

Each vehicle used to place, maintain and remove components of a traffic control system on multilane highways shall be equipped with a Type II flashing arrow sign which shall be in operation when the vehicle is being used for placing, maintaining, or removing the components. Vehicles equipped with Type II flashing arrow sign not involved in placing, maintaining, or removing the components when operated within a stationary type lane closure shall only display the caution display mode. The sign shall be controllable by the operator of the vehicle while the vehicle is in motion. The flashing arrow sign shown on the plans shall not be used on the vehicles which are doing the placing, maintaining and removing of components of a traffic control system, and shall be in place before a lane closure requiring its use is completed.

The 150-m section of lane closure, shown along lane lines between the 300-m lane closure tapers on the plans entitled "Traffic Control System for Lane Closures on Freeways and Expressways" and "Traffic Control System for Lane and Complete Closures on Freeways and Expressways" shall not be used.

The traffic cones shown to be placed transversely across closed traffic lanes and shoulders on the plans entitled "Traffic Control System for Lane Closures on Freeways and Expressways" and "Traffic Control System for Lane and Complete Closures on Freeways and Expressways" shall not be placed.

MOVING TYPE LANE CLOSURE.—Flashing arrow signs used in moving lane closures shall be truck-mounted. Changeable message signs used in moving lane closure operations shall conform to Section 12-3.12, "Portable Changeable Message Signs," of the Standard Specifications, except the signs shall be truck-mounted and the full operation height of the bottom of the sign may be less than 2.1 m above the ground, but should be as high as practicable.

Truck-mounted crash cushions (TMCC) for use in moving lane closures shall be any of the following approved models, or equal:

Hexfoam TMA Series 3000, Alpha 1000 TMA Series 1000, Alpha 2001 TMA Series 2001, manufactured by Energy Absorption Systems, Inc., One East Wacker Drive, Chicago, IL 60601-2076, Telephone (312) 467-6750.

Distributor(Northern): Traffic Control Service, Inc., 8585 Thys Court, Sacramento, CA 95828, Telephone 1-800-884-8274, FAX (916) 387-9734.

Distributor(Southern): Traffic Control Service, Inc., 1881 Betmor Lane, Anaheim, CA 92805, Telephone 1-800-222-8274.

Cal T-001 Model 2 or Model 3, manufacturer and distributor; Hexcel Corporation, 11711 Dublin Boulevard, P.O. Box 2312, Dublin, CA 94568, Telephone (510) 828-4200.

Renco Rengard Model Nos. CAM 8-815 and RAM 8-815, manufacturer and distributor, Renco Inc., 1582 Pflugerville Loop Road, P.O. Box 730, Pflugerville, TX 78660-0730, Telephone 1-800-654-8182.

Each TMCC shall be individually identified with the manufacturer's name, address, TMCC model number, and a specific serial number. The names and numbers shall each be a minimum 13 mm high, and located on the left (street) side at the lower front corner. The TMCC shall have a message next to the name and model number in 13 mm high letters which states, "The bottom of this TMCC shall be ____ mm \pm ____ mm above the ground at all points for proper impact performance." Any TMCC which is damaged or appears to be in poor condition shall not be used unless recertified by the manufacturer. The Engineer shall be the sole judge as to whether used TMCCs supplied under this contract need recertification. Each unit shall be certified by the manufacturer to meet the requirements for TMCCs in accordance with the standards established by the Transportation Laboratory Structures Research Section.

Approvals for new TMCC designs proposed as equal to the above approved models shall be in accordance with the procedures (including crash testing) established by the Transportation Laboratory Structures Research Section. For information regarding submittal of new designs for evaluation contact: Transportation Laboratory, Structures Research Section, P.O. Box 19128, 5900 Folsom Boulevard, Sacramento, CA 95819.

New TMCCs proposed as equal to approved TMCCs or approved TMCCs determined by the Engineer to need recertification shall not be used until approved or recertified by the Transportation Laboratory Structures Research Section.

PAYMENT.—The contract lump sum price paid for traffic control system shall include full compensation for furnishing all labor, materials (including signs), tools, equipment and incidentals, and for doing all the work involved in placing, removing, storing, maintaining, moving to new locations, replacing and disposing of the components of the

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traffic control system as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The adjustment provisions in Section 4-1.03, "Changes," of the Standard Specifications, shall not apply to the item of traffic control system. Adjustments in compensation for traffic control system will be made only for increased or decreased traffic control system required by changes ordered by the Engineer and will be made on the basis of the cost of the increased or decreased traffic control necessary. The adjustment will be made on a force account basis as provided in Section 9-1.03, "Force Account Payment," of the Standard Specifications for increased work, and estimated on the same basis in the case of decreased work.

Traffic control system required by work which is classed as extra work, as provided in Section 4-1.03D of the Standard Specifications, will be paid for as a part of the extra work.

10-1.09 TEMPORARY RAILING

Temporary railing (Type K) shall be placed at the locations shown on the plans, specified in these special provisions or in the Standard Specifications or ordered by the Engineer, and shall conform to the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

Temporary railing (Type K) fabricated prior to January 1, 1993, with one longitudinal No. 15 (No. 5 imperial) reinforcing steel bar near the top in lieu of the 2 longitudinal No. 15 reinforcing steel bars near the top, as shown on the plans, may be used.

The Contractor's attention is directed to the provisions in "Public Safety" and "Order of Work" elsewhere in these special provisions.

Temporary railing (Type K) placed in accordance with the provisions in "Public Safety" elsewhere in these special provisions will not be measured nor paid for.

10-1.10 TRAFFIC PLASTIC DRUMS

Traffic plastic drums shall conform to the requirements for traffic control devices in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

Traffic plastic drums shall be constructed of low-density polyethylene material and shall be flexible or collapsible upon impact by a vehicle. The traffic plastic drum shall have a weighted base that will separate from the drum. The base shall be of such shape as to preclude rolling upon impact by a vehicle. The base shall be of sufficient weight to maintain the drum in position and upright. The base or external ballast rings shall not exceed 101.6 mm in height, and drum rings shall not exceed 965.2 mm maximum in diameter. The base or external rings placed over and around the drum, resting on the pavement or ground shall contain the ballast for the drums. Ballast for drums shall be sand or water, except sand shall be used in areas susceptible to freezing. The base shall have drain holes to prevent the accumulation of water. Sand bags shall not be used as ballast for drums.

The body of the traffic plastic drum shall be of a fluorescent orange or predominately orange color. Drums shall be a minimum of 914.4 mm in height above the traveled way, and have at least an 457.2 mm minimum width, regardless of orientation.

The markings on drums shall be horizontal, circumferential, alternating orange and white reflective bands 101.6 to 152.4 mm wide. Each drum shall have a minimum of 2 orange and 2 white bands. The top of the uppermost reflective band shall be no lower than 152.4 mm from the top of the drum. Any non-reflective spaces between the bands shall not exceed 50.8 mm in width. The reflective sheeting shall conform to the provisions in "Prequalified and Tested Signing and Delineation Materials," elsewhere in these special provisions.

Only one type of traffic plastic drum shall be used on the project. The type of traffic plastic drum proposed for use on the project shall be submitted to the Engineer for approval, prior to placement on the project.

In curvilinear alignment traffic plastic drums shall be used only on one side of the traveled way. Traffic plastic drums shall be placed on the alignment and location shown on the plans, or directed by the Engineer. Traffic plastic drums shall be placed uniformly, straight on tangent alignment and on a true arc on curved alignment. All layout work necessary to place the traffic plastic drums to the proper alignment shall be performed by the Contractor.

If traffic plastic drums are displaced or are not in an upright position, from any cause, the traffic plastic drums shall immediately be replaced or restored to their original location, in an upright position, by the Contractor.

At the option of the Contractor, where portable delineators, cones or Type I or II barricades are specified in the specifications or shown on the plans, traffic plastic drums may be used in place of those portable delineators, cones or Type I or II barricades.

At the completion of the project, traffic plastic drums shall become the property of the Contractor and removed from the site of the work.

Traffic plastic drums shall be installed as shown on the plans when temporary railing (Type K) is placed as required by "Public Safety" elsewhere in these special provisions.

Traffic plastic drums will be measured as units from actual count of the number of traffic plastic drum designated on the plans or ordered by the Engineer. After initial placement of traffic plastic drums, and if ordered by the Engineer, the traffic plastic drums shall be moved from location to location and the cost thereof will be paid for as extra work as

provided in Section 4-1.03D. Traffic plastic drums which are used as part of traffic control system in place of cones, delineators or barricades or which are used in accordance with the requirements of "Public Safety" elsewhere in these special provisions or which are placed in excess of the number specified or shown will not be included in the count of traffic plastic drums to be paid for.

The contract unit price paid for traffic plastic drum shall include full compensation for furnishing all labor, materials (including ballast), tools, equipment, and incidentals, and for doing all the work involved in furnishing, placing, maintaining, repairing, replacing and removing the traffic plastic drum, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.11 TEMPORARY CRASH CUSHION MODULE

This work shall consist of furnishing, installing and maintaining sand filled temporary crash cushion modules in groupings or arrays at each location shown on the plans, specified in the special provisions or directed by the Engineer. The grouping or array of sand filled modules shall form a complete sand filled temporary crash cushion in accordance with the details shown on the plans and these special provisions.

Attention is directed to "Public Safety" and "Temporary Railing" of these special provisions.

GENERAL. Whenever the work or the Contractor's operations establishes a fixed obstacle, the exposed fixed obstacle shall be protected with a sand filled temporary crash cushion. The sand filled temporary crash cushion shall be in place prior to opening the lanes adjacent to the fixed obstacle to public traffic.

Sand filled temporary crash cushions shall be maintained in place at each location, including times when work is not actively in progress. Sand filled temporary crash cushions may be removed during a work period for access to the work provided that the exposed fixed obstacle is 4.6 m or more from a lane carrying public traffic and the temporary crash cushion is reset to protect the obstacle prior to the end of the work period in which the fixed obstacle was exposed. When no longer required, as determined by the Engineer, sand filled temporary crash cushions shall be removed from the site of the work.

MATERIALS. At the Contractor's option, the modules for use in sand filled temporary crash cushions shall be either Energite Inertial Modules, Fitch Inertial Modules or equal:

Energite Inertial Modules manufactured by Energy Absorption Systems, Inc., One East Wacker Drive, Chicago, IL 60601-2076, Telephone (312) 467-6750.

Distributor(Northern): Traffic Control Service, Inc., 8585 Thys Court, Sacramento, CA 95828, Telephone 1-800-884-8274, FAX (916) 387-9734

Distributor(Southern): Traffic Control Service, Inc., 1881 Betmor Lane, Anaheim, CA 92805, Telephone 1-800-222-8274.

Fitch Inertial Modules, national distributor; Roadway Safety Service, Inc., 700-3 Union Parkway, Ronkonkoma, NY 11779.

Distributor: Singletree Sales Company, 1533 Berger Drive, San Jose, CA 95112, Telephone 1-800-822-7735.

Modules contained in each temporary crash cushion shall be of the same type at each location. The color of the modules shall be the standard yellow color as furnished by the vendor, with black lids. The modules shall exhibit good workmanship free from structural flaws and objectionable surface defects. The modules need not be new. Good used undamaged modules conforming to color and quality of the types specified above may be utilized. If used Fitch modules requiring a seal are furnished, the top edge of the seal shall be securely fastened to the wall of the module by a continuous strip of heavy duty tape.

Modules shall be filled with sand in accordance with the manufacturer's directions, and to the sand capacity in kilograms for each module as shown on the plans. Sand for filling the modules shall be clean washed concrete sand of commercial quality. At the time of placing in the modules, the sand shall contain not more than 7 percent water, as determined by California Test 226.

Modules damaged due to the Contractor's operations shall be repaired immediately by the Contractor at the Contractor's expense. Modules damaged beyond repair, as determined by the Engineer, due to the Contractor's operations shall be removed and replaced by the Contractor at the Contractor's expense.

INSTALLATION. Temporary crash cushion modules shall be placed on movable pallets or frames conforming to the dimensions shown on the plans. The pallets or frames shall provide a full bearing base beneath the modules. The modules and supporting pallets or frames shall not be moved by sliding or skidding along the pavement or bridge deck.

A Type R or P marker panel shall be attached to the front of the crash cushion as shown on the plans, when the closest point of crash cushion array is within 3.6 m of the traveled way. The marker panel, when required, shall be firmly fastened to the crash cushion with commercial quality hardware or by other methods approved by the Engineer.

At the completion of the project, temporary crash cushion modules, sand filling, pallets or frames, and marker panels shall become the property of the Contractor and shall be removed from the site of the work. Temporary crash cushion modules shall not be installed in permanent work.

MEASUREMENT AND PAYMENT. Temporary crash cushion modules will be measured by the unit determined from the actual count of modules used in the work or ordered by the Engineer at each location. Temporary crash cushion modules placed in accordance with the provisions in "Public Safety" elsewhere in these special provisions and modules placed in excess of the number specified or shown will not be measured nor paid for.

10-1.12 CONSTRUCTION AREA SIGNS

Construction area signs shall be furnished, installed, maintained, and removed when no longer required in accordance with the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

The Contractor shall notify the appropriate regional notification center for operators of subsurface installations at least 2 working days, but not more than 14 calendar days, prior to commencing any excavation for construction area sign posts. The regional notification centers include but are not limited to the following:

Notification Center	Telephone Number
Underground Service Alert Northern California (USA)	1-800-642-2444 1-800-227-2600
Underground Service Alert Southern California (USA)	1-800-422-4133 1-800-227-2600

All excavations required to install construction area signs shall be performed by hand methods without the use of power equipment, except that power equipment may be used if it is determined there are no utility facilities in the area of the proposed post holes.

Sign substrates for stationary mounted construction area signs may be fabricated from fiberglass reinforced plastic as specified under "Prequalified and Tested Signing and Delineation Materials" elsewhere in these special provisions.

Type IV reflective sheeting for sign panels for portable construction area signs shall conform to the requirements specified under "Prequalified and Tested Signing and Delineation Materials" elsewhere in these special provisions.

The contract lump sum price paid for construction area signs shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in installing the construction area signs and post, complete in place, as shown on the plans.

10-1.13 EXISTING HIGHWAY FACILITIES

The work performed in connection with various existing highway facilities shall conform to the provisions in Section 15, "Existing Highway Facilities," of the Standard Specifications and these special provisions.

10-1.14 REMOVE DRAINAGE FACILITIES

Existing box culverts, inlets, headwalls and endwalls, where any portion of these structures is within one meter of the grading plane in excavation areas, or within 0.3-m of original ground in embankment areas, or where shown on the plans to be removed, shall be completely removed and disposed of.

10-1.15 REMOVE PIPE

Existing drainage pipes where shown on the plans to be removed, shall be removed.

The pipe shall be disposed of outside the highway right of way. The disposal shall conform to the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

10-1.16 REMOVE ASPHALT CONCRETE DIKE

Existing asphalt concrete dike, where shown on the plans to be removed, shall be removed.

Prior to removing the dike, the outside edge of the asphalt concrete to remain in place shall be cut to a neat line. The cut shall be a minimum depth of 50 mm.

The dike shall be removed in such a manner so that the surfacing which is to remain in place is not damaged.

The dike shall be disposed of outside the highway right of way. The disposal shall conform to the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

The dike may be buried in embankments in the same manner as provided for burying concrete in embankments in Section 15-3, "Removing Concrete," of the Standard Specifications.

For Location No. 2, full compensation for removing base and asphalt concrete shall be considered as included in the contract unit price paid for minor concrete (miscellaneous construction) and no separate payment will be made therefore. For Locations No. 3, 5 and 7, the contract unit price paid per meter for remove asphalt curb/dike shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in removing existing asphalt curb/dike as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

10-1.17 REMOVE ASPHALT CONCRETE

Existing base and bituminous surfacing shown on the plans to be removed, shall be removed to a depth of at least 150 mm below the grade of the existing surfacing. Resulting holes and depressions shall be backfilled with earthy material selected from excavation to the lines and grade established by the Engineer.

For Location No. 1, full compensation for removing base and asphalt concrete shall be considered as included in the contract unit price paid for Compost Filter BMP and no separate payment will be made therefore. For Location No. 2, full compensation for removing base and asphalt concrete shall be considered as included in the contract unit price paid for Type II Sand Filter BMP and no separate payment will be made therefore. For Locations No. 4 and 5, full compensation for removing base and asphalt concrete shall be considered as included in the contract unit price paid for Type I Sand Filter BMP and no separate payment will be made therefore. For Locations No. 3 and 7, the contract unit price paid per square meter for remove asphalt shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in removing existing asphalt concrete, aggregate base and sub-base to sufficient depth to construct new surfacing as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

10-1.18 REMOVE CONCRETE

Concrete, designated on the plans to be removed and as directed by the Engineer, shall be removed. All work involving removing concrete shall include, but not be limited to, concrete curb, gutter, and swales. Concrete removed shall be disposed of outside the highway right of way in accordance with the provisions in Section 7-1.13 of the Standard Specifications.

For Location No. 1, full compensation for removing concrete gutter shall be considered as included in the contract unit price paid for minor concrete (miscellaneous construction) and no separate payment will be made therefore. For Location No. 7, the contract unit price paid per square meter for remove concrete gutter shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in removing concrete gutters as shown on the plans, as specified in these special provisions, and as directed by the Engineer. The contract unit price paid per meter for remove concrete curb shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in removing concrete curbs and dikes as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

10-1.19 REMOVE STOCKPILE

Existing stockpiles, designated on the plans to be removed and as directed by the Engineer, shall be removed.

Stockpile removal will be measured and paid for under the provisions of clearing and grubbing and no separate payment will be made therefor.

10-1.20 ADJUST FRAMES AND COVERS AND FRAMES AND GRATES TO GRADE

Frames and covers and frames and grates of existing manholes, inlets, meters, or other facilities shall be adjusted to grade in accordance with the provisions in Section 15-2.05, "Reconstruction," of the Standard Specifications, as shown on plans or as directed by the Engineer.

Full compensation for adjusting frames and covers and frames and grates to grade shall be considered as included in the contract price paid for the various items of work involved and no separate payment will be made therefor.

10-1.21 RELOCATE IRRIGATION SYSTEMS

Relocate existing irrigation facilities shall consist of relocating existing electric remote control valves, sprinklers, pull boxes, backflow preventers, gate valves, wye strainers, irrigation controllers and other facilities as shown on the plans or specified in these special provisions.

Relocate existing valves shall consist of relocating existing valves, valve boxes and valve box covers. Relocated valve boxes shall be installed with new woven wire cloth and crushed rock bedding as shown on the plans.

Relocate existing sprinklers shall consist of relocating existing sprinklers, risers, riser supports, check valves and concrete protectors as shown on the plans.

Relocate pull boxes shall consist of relocating existing pull boxes and pull box covers. Relocated pull boxes shall be installed on new woven wire cloth and crushed rock bedding as shown on the plans for valve box installations.

Relocate backflow preventer assemblies shall consist of relocating existing backflow preventers, wye strainers and gate valves; furnishing and installing galvanized steel pipe supply line and fittings, and pipe supply lines to the water meters or points of connections; and constructing concrete pads and concrete pipe supports.

Relocate existing irrigation controllers shall consist of relocating the existing controllers, controller enclosures and controller enclosure cabinets; constructing concrete pads; and furnishing and installing anchor bolts, electrical conduits, including control and neutral conductors and electrical power conductors. Conduits for control and neutral conductors and electrical power conductors shall terminate in separate new or relocated pull boxes located within 5 feet of the new concrete pads.

Relocate existing electrical power (irrigation) for the irrigation controllers shall conform to the requirements specified under "Electrical Service (Irrigation)" elsewhere in these special provisions.

Existing irrigation systems, designated on the plans to be relocated, that are, in the opinion of the Engineer, unsuitable for the purpose intended, shall be replaced in accordance with the provisions in Section 15-2.05, "Reconstruction," of the Standard Specifications. Prior to irrigation system relocation, the Contractor shall test and check the existing irrigation system to determine proper operation of the existing system.

After irrigation systems have been relocated, the Contractor shall demonstrate to the Engineer that the relocated systems function properly.

The contract lump sum per location price paid for relocating irrigation systems shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in relocating irrigation systems, complete in place, as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

10-1.22 REMODEL DRAINAGE FACILITY

Remodal drainage facility shall conform to the provisions in Section 15.2, "Miscellaneous Highway Facilities," of the Standard Specifications.

10-1.23 CLEARING AND GRUBBING

Clearing and grubbing shall conform to the provisions in Section 16, "Clearing and Grubbing," of the Standard Specifications.

Where no joint exists between concrete to be removed and concrete to remain in place, the concrete shall be cut in a neat line to a minimum depth of 50 mm with a power driven saw before concrete is removed.

Where concrete has been removed outside the roadway prism, the backfilled areas shall be graded to drain and blend in with the surrounding terrain.

Concrete to be removed which has portions of the same structure both above and below ground will be considered as concrete above ground for compensation.

10-1.24 EARTHWORK

Earthwork shall conform to the provisions in Section 19, "Earthwork," of the Standard Specifications.

10-1.25 DITCH EXCAVATION

Ditch excavation shall conform to the provisions in Section 19.4, "DITCH EXCAVATION" of the Standard Specifications.

Surplus excavated material shall become the property of the Contractor and shall be disposed of outside the highway right of way in accordance with the provisions in Section 7-1.13 of the Standard Specifications.

The contract price paid per cubic meter for ditch excavation shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, embankment placement and compaction, disposal of surplus material and ditch excavation of all biofilter swales regardless of bottom width, complete in place, as shown on the plans, as specified in these special provisions, and as directed by the Engineer. Ditch excavation involved in all concrete swales, curbs, ditches, gutters and swales will be measured and paid for under the provisions of minor concrete (miscellaneous concrete).

10-1.26 EMBANKMENT

Embankment shall conform to the provisions in Section 19, "EMBANKMENT CONSTRUCTION" of the Standard Specifications

Embankment construction will be measured and paid for under the provisions of ditch excavation.

10-1.27 AGGREGATE BASE

Aggregate base shall be Class 2 and shall conform to the provisions in Section 26, "Aggregate Bases," of the Standard Specifications and these special provisions.

The first paragraph of Section 26-1.02A, "Class 2 Aggregate Base," of the Standard Specifications is amended by adding the following sentences:

Aggregate may include or consist of material processed from reclaimed asphalt concrete, portland cement concrete, lean concrete base, cement treated base, glass or a combination of any of these materials. Aggregate base incorporating reclaimed glass shall not be placed at locations where surfacing will not be placed over the aggregate base.

The fourth paragraph in Section 26-1.02A, is amended by adding the following sentence:

Untreated reclaimed asphalt concrete and portland cement concrete will not be considered to be treated with lime, cement or other chemical material for purposes of performing the Durability Index test.

For Location No. 1, full compensation for aggregate base shall be considered as included in the contract unit price paid for Compost Filter BMP and no separate payment will be made therefore. For Location No. 2, full compensation for aggregate base shall be considered as included in the contract unit price paid for Type II Sand Filter BMP and no separate payment will be made therefore

10-1.28 ASPHALT CONCRETE

Asphalt concrete shall be Type B and shall conform to the provisions in Section 39, "Asphalt Concrete," of the Standard Specifications and these special provisions.

The amount of asphalt binder used in asphalt concrete placed in dikes, gutters, gutter flares, overside drains and aprons at the ends of drainage structures shall be increased one percent by mass of the aggregate over the amount of asphalt binder determined for use in asphalt concrete placed on the traveled way.

The miscellaneous areas to be paid for at the contract price per square meter for place asphalt concrete (miscellaneous area) in addition to the prices paid for the materials involved shall be limited to the areas listed on the plans.

The miscellaneous areas to be paid for at the contract price per square meter for place asphalt concrete (miscellaneous area) in addition to the prices paid for the materials involved shall be limited to ditches, overside drains, aprons at the ends of drainage structures, and those areas called out on the plans as miscellaneous areas.

Aggregate for asphalt concrete dikes shall conform to the 9.5-mm, maximum grading as specified in Section 39-2.02, "Aggregate," of the Standard Specifications.

If the Contractor selects the batch mixing method, asphalt concrete shall be produced by the automatic batch mixing method as provided in Section 39-3.03A(2), "Automatic Proportioning," of the Standard Specifications.

If the finished surface of the asphalt concrete does not meet the specified surface tolerances, it shall be brought within tolerance by either (1) abrasive grinding (with fog seal coat on the areas which have been ground), (2) removal and replacement, or (3) placing an overlay of asphalt concrete. The method will be selected by the Engineer. The corrective work shall be at the Contractor's expense.

If abrasive grinding is used to bring the finished surface to specified surface tolerances, additional grinding shall be performed as necessary to extend the area ground in each lateral direction so that the lateral limits of grinding are at a constant offset from, and parallel to the nearest lane line or pavement edge, and in each longitudinal direction so that the grinding begins and ends at lines normal to the pavement centerline, within any ground area. All ground areas shall be neat rectangular areas of uniform surface appearance. Abrasive grinding shall conform to the requirements in the first paragraph and the last 4 paragraphs in Section 42-2.02, "Construction," of the Standard Specifications.

Except for aggregate for Open Graded asphalt concrete, in addition to the aggregate requirements listed in Section 39, "Asphalt Concrete," of the Standard Specifications, the combined aggregates shall conform to the following quality requirement when mixed with paving asphalt Grade AR-4000 in the amount of asphalt determined to be optimum by California Test 367:

Test	California Test	Requirement
Surface Abrasion	360, Method A	Loss not to exceed 15 grams

The area to which paint binder has been applied shall be closed to public traffic. Care shall be taken to avoid tracking binder material onto existing pavement surfaces beyond the limits of construction.

A drop-off of more than 46 mm will not be allowed at any time between adjacent lanes open to public traffic.

The Contractor shall schedule paving operations so that each layer of asphalt concrete is placed on all contiguous lanes of a traveled way each work shift. At the end of each work shift, the distance between the ends of the layers of asphalt concrete on adjacent lanes shall not be greater than 3 m nor less than 1.5 m. Additional asphalt concrete shall be placed along the transverse edge at the end of each lane and along the exposed longitudinal edges between adjacent lanes,

hand raked, and compacted to form temporary conforms. Kraft paper, or other approved bond breaker, may be placed under the conform tapers to facilitate the removal of the taper when paving operations resume.

Half-width surfacing operations shall be conducted in such manner that, at the end of each day's work, the distance between the ends of adjacent surfaced lanes shall not be greater than can be completed in the following day of normal surfacing operations.

Shoulders or median borders adjacent to a lane being paved shall be surfaced prior to opening the lane to traffic.

Shoulder conform tapers, as shown on the plans, shall be placed concurrently with the paving of the adjacent lane.

Asphalt concrete surfacing shall be placed on all existing surfacing, including curve widening, chain control lanes, turnouts, left turn pockets, and public and private road connections shown on the plans, unless otherwise directed by the Engineer.

Additional asphalt concrete surfacing material shall be placed along the edge of the surfacing at road connections and private drives, hand raked, if necessary, and compacted to form smooth tapered conforms. Full compensation for furnishing all labor and tools and doing all the work necessary to hand rake these conforms shall be considered as included in the contract prices paid per tonne for the various contract items of asphalt concrete surfacing involved and no additional compensation will be allowed therefor.

For Location No. 1, full compensation for asphalt concrete shall be considered as included in the contract unit price paid for Compost Filter BMP and no separate payment will be made therefor. For Location No. 2, full compensation for asphalt concrete shall be considered as included in the contract unit price paid for Type II Sand Filter BMP and no separate payment will be made therefor.

10-1.29 MAINTENANCE VEHICLE PULLOUTS

Maintenance vehicle pullouts shall be constructed as shown on the plans and in accordance with these special provisions.

EARTHWORK.--Earthwork shall conform to the provisions in Section 19, "Earthwork," of the Standard Specifications and these special provisions.

The grading plane at any point shall not be more than 15 millimeters above the grade established by the Engineer.

A relative compaction of not less than 95 percent shall be obtained for a minimum depth of 150 millimeters below the grading plane.

Surplus excavated material shall become the property of the Contractor and shall be disposed of outside the highway right of way in accordance with the provisions in Section 7-1.13 of the Standard Specifications.

AGGREGATE BASE.--Aggregate for aggregate base shall conform to the requirements specified for 19 millimeters, maximum, aggregate grading in Section 26-1.02A, "Class 2 Aggregate Base," of the Standard Specifications.

Aggregate base shall be a minimum of 15 millimeters thick. Aggregate base shall be spread and compacted in accordance with the provisions in Section 26-1.04, "Spreading", and Section 26-1.05, "Compacting," of the Standard Specifications

ASPHALT CONCRETE.--Asphalt concrete for maintenance vehicle pullouts shall be a minimum 76 millimeters thick in compacted thickness and shall conform to the provisions in "Asphalt Concrete" elsewhere in these special provisions, except the aggregate shall conform to the 15 millimeter maximum grading.

Type B Pullout will be measured and paid for under the provisions of asphalt concrete and aggregate base.

10-1.30 MISCELLANEOUS CONCRETE CONSTRUCTION

Local depression for drainage inlets, concrete pads, concrete swale, concrete collar, inlet channels, concrete transitions, overflow channel, concrete ditches, concrete gutters, and curbs shall conform to the provisions in Section 73, "Concrete Curbs and Sidewalks," of the Standard Specifications.

10-1.31 REINFORCEMENT

Reinforcement shall conform to the provisions in Section 52, "Reinforcement," of the Standard Specifications and these special provisions.

Attention is directed to "Substitution of Non-Metric Materials and Products" and "Welding Quality Control" elsewhere in these special provisions.

Where mandatory bar substitutions are required or where non-metric reinforcement is optionally substituted for metric reinforcement in accordance with these specifications, the requirements for bending, placing or splicing which are based on the size of reinforcement shall be based on the nominal size of the actual reinforcement used.

The first and second paragraphs of Section 52-1.02A, "Bar Reinforcement," of the Standard Specifications are amended to read:

Reinforcing bars shall be low-alloy steel deformed bars conforming to the specifications of ASTM Designation: A 706/A 706M and the following:

Where reinforcing bars shown on the plans or specified have a metric bar designation number shown in column "A" of the table below, corresponding bars from column "B" shall be substituted therefore.

A	B
METRIC BAR DESIGNATION NUMBER AS SHOWN ON THE PLANS OR SPECIFIED	METRIC BAR DESIGNATION NUMBER WHICH SHALL BE SUBSTITUTED FOR BARS LISTED IN COLUMN "A"
10	13
15	16
20	19
25	25
30	32*
35	36
45	43
55	57

* Spacing of bars may be increased a maximum of 15 percent or the total number of bars may be decreased a maximum of 15 percent, unless otherwise specified.

Where the spacing of No. 30 bars is shown on the plans, the spacing of substituted No. 32 bars may be increased from that shown on the plans by a maximum of 15 percent.

Where the total number of No. 30 bars is shown on the plans, the total number of substituted No. 32 bars may be decreased from that shown on the plans by a maximum of 15 percent. The total number of substituted No. 32 bars shall be distributed in the same manner as shown on the plans for the No. 30 bars.

Where No. 30 bars are shown on the plans as vertical reinforcement in any columns or piles, the total number of substituted No. 32 bars shall be decreased from that shown on the plans for the No. 30 bars by the minimum number of bars to achieve a 15 percent reduction. The substituted No. 32 bars shall be distributed in the same manner as shown on the plans for the No. 30 bars.

At the option of the Contractor, non-metric reinforcing bars may be substituted for metric bars as shown in the table below.

METRIC BAR DESIGNATION NUMBER AS SHOWN ON THE PLANS, SPECIFIED, OR PREVIOUSLY SUBSTITUTED	NON-METRIC BAR DESIGNATION NUMBER WHICH MAY BE SUBSTITUTED
13	4
16	5
19	6
22	7
25	8
29	9
32	10
36	11
43	14
57	18

At the option of the Contractor, deformed or plain billet-steel bars conforming to ASTM Designation: A 615/A 615M, Grade 300 or 420, may be used as reinforcement in the following 5 categories:

1. Slope and channel paving;
2. Minor structures;
3. Sign and signal foundations (pile and spread footing types);
4. Roadside rest facilities; and
5. Concrete barrier Type 50 and Type 60 series and temporary railing.

When reinforcement conforming to ASTM Designation: A 615/A 615M, Grade 300 or 420 is used in the above 5 categories, all mandatory and optional substitutions, and increases in spacing or decrease in total number of bars, as specified above for ASTM Designation: A 706/A 706M reinforcement, shall apply. No other increases in spacing or decreases in the total number of bars, from that shown on the plans or specified, will be allowed.

Unless otherwise specified, all reinforcing bars shall be placed in accordance with the size and spacing, or size and total number, as shown on the plans or specified. Two copies of a list showing any changes in spacing or total number of bars from that shown on the plans or specified, and showing any non-metric bars that are substituted for metric bars, shall be furnished to the Engineer in accordance with the provisions of Section 52-1.03, "Steel Lists," of the Standard Specifications.

No adjustment will be required in spacing or total number of bars due to a difference in minimum yield strength between metric and non-metric bars.

Deformations specified in ASTM Designation: A 706/A 706M will not be required on bars used as spiral or hoop reinforcement in structures and concrete piles.

The last paragraph of Section 52-1.07, "Placing," of the Standard Specifications is amended to read:

Whenever a portion of an assemblage of bar reinforcing steel that is not encased in concrete exceeds 6 m in height, the Contractor shall submit to the Engineer for approval, in accordance with the provisions in Section 5-1.02, "Plans and Working Drawings," working drawings and design calculations for the temporary support system to be used. The working drawings and design calculations shall be signed by an engineer who is registered as a Civil Engineer in the State of California. The temporary support system shall be designed to resist all expected loads and shall be adequate to prevent collapse or overturning of the assemblage. If the installation of forms or other work requires revisions to or temporary release of any portion of the temporary support system, the working drawings shall show the support system to be used during each phase of construction. The minimum horizontal wind load to be applied to the bar reinforcing steel assemblage, or to a combined assemblage of reinforcing steel and forms, shall be not less than 960 Pa on the gross projected area of the assemblage.

The first paragraph of Section 52-1.08, "Splicing," of the Standard Specifications is amended to read:

Splicing of reinforcing bars shall be by lapping, butt welding, mechanical butt splicing, or mechanical lap splicing, at the option of the Contractor. Reinforcing bars Nos. 43 through 57 shall not be spliced by lapping.

The sixth paragraph of Section 52-1.08, "Splicing," of the Standard Specifications is amended to read:

Except when otherwise specified, mechanical lap splicing shall conform to the details shown on the plans, the requirements for mechanical butt splices as specified in this Section 52-1.08, and Sections 52-1.08C, "Mechanical Butt Splices," 52-1.08D, "Qualification of Welding and Mechanical Splicing," and 52-1.08E, "Job Control Tests," and the following:

The mechanical lap splice shall be a unit consisting of a sleeve, in which the reinforcing bars are positioned, and a wedge driven through holes in the sleeve and between the reinforcing bars. The mechanical lap splice shall only be used for splicing non-epoxy-coated deformed reinforcing bars Nos. 13, 16 and 19. One mechanical lap splice unit per splice shall be used.

The eighth and ninth paragraphs of Section 52-1.08, "Splicing," of the Standard Specifications are amended to read:

Unless otherwise shown on the plans or approved by the Engineer, splices in adjacent reinforcing bars at any particular section shall be staggered. The minimum distance between staggered lap splices or mechanical lap splices shall be the same length required for a lapped splice in the largest bar. The minimum distance between staggered butt splices shall be 600 mm. All distances shall be measured between the midpoints of the splices along a line which is centered between the axes of the adjacent bars.

Completed butt splices shall develop a minimum tensile strength, based on the nominal bar area, of 430 MPa for ASTM Designation: A 615/A 615M, Grade 300 bars, and 550 MPa for ASTM Designation: A 615/A 615M, Grade 420 and ASTM Designation: A 706/A 706M bars. If butt splices are made between two bars of dissimilar strengths, the minimum required tensile strength for the splice shall be that required for the weaker bar.

The second sentence of the eleventh paragraph of Section 52-1.08, "Splicing," of the Standard Specifications is amended to read:

Job control tests shall be made on sample splices representing each lot of mechanical butt splices as provided in Section 52-1.08E, "Job Control Tests."

The third and fourth paragraphs of Section 52-1.08A, "Lapped Splices," of the Standard Specifications are amended as follows:

Where ASTM Designations: A 615/A 615M, Grade 420 or A 706/A 706M reinforcing bars are required, the length of lapped splices shall be as follows: Reinforcing bars No. 25, or smaller, shall be lapped at least 45

diameters of the smaller bar joined, and reinforcing bars Nos. 29, 32 and 36 shall be lapped at least 60 diameters of the smaller bar joined, except when otherwise shown on the plans.

Where ASTM Designation: A 615/A 615M, Grade 300 reinforcing bars are permitted, the length of lapped splices shall be as follows: Reinforcing bars No. 25, or smaller, shall be lapped at least 30 diameters of the smaller bar joined, and reinforcing bars Nos. 29, 32 and 36 shall be lapped at least 45 diameters of the smaller bar joined, except when otherwise shown on the plans.

Section 52-1.08B, "Butt Welded Splices," of the Standard Specifications is replaced with the following:

52-1.08B Butt Welded Splices.—All butt welded splices in reinforcing bars shall be complete joint penetration butt welds conforming to the requirements in AWS D1.4, and the requirements of these specifications and the special provisions. At the option of the Contractor, shop produced resistance butt welds that are produced by a fabricator who is approved by the Transportation Laboratory may be used.

Only the joint details and dimensions as shown in Figure 3.2, "Direct Butt Joints," of AWS D 1.4-92, shall be used for making complete joint penetration butt welds of bar reinforcement. Split pipe backing shall not be used.

Material used as backing for complete joint penetration butt welds of bar reinforcement shall be a flat plate conforming to the requirements of ASTM Designation: A 709/A 709M, Grade 36[250]. The flat plate shall be 6 mm thick with a width, as measured perpendicular to the axis of the bar, equal to the nominal diameter of the bar, and a length which does not exceed twice the nominal diameter of the bar. The flat plate backing shall be fitted tightly to the bar with the root of the weld centered on the plate. Any bar deformation or obstruction preventing a tight fit shall be ground smooth and flush with the adjacent surface. Tack welds used to fit backing plates shall be within the weld root area so that they are completely consumed by the finished weld. Backing plates shall not be removed.

Butt welds shall be made with multiple weld passes using a stringer bead without an appreciable weaving motion. The maximum stringer bead width shall be 2.5 times the diameter of the electrode and slagging shall be performed between each weld pass. Weld reinforcement shall not exceed 4 mm in convexity.

Before any electrodes or flux-electrode combinations are used, the Contractor, at the Contractor's expense, shall furnish certified copies of test reports for all the pertinent tests specified in AWS A5.1, AWS A5.5, AWS A5.18 or AWS A5.20, whichever is applicable, made on electrodes or flux-electrode combinations of the same class, brand and nearest specified size as the electrodes to be used. The tests may have been made for process qualification or quality control, and shall have been made within one year prior to manufacture of the electrodes and fluxes to be used. The report shall include the manufacturer's certification that the process and material requirements were the same for manufacturing the tested electrodes and the electrodes to be used. The forms and certificates shall be as directed by the Engineer.

Electrodes for manual shielded metal arc welding of ASTM Designation: A 615/A 615M, Grade 420 bars shall conform to the requirements of AWS A5.5 for E9018-M or E10018-M electrodes.

Electrodes for manual shielded metal arc welding of A 706/A 706M bars shall conform to the requirements of AWS A5.5 for E8016-C3 or E8018-C3 electrodes.

Solid and composite electrodes for semiautomatic gas metal-arc and flux-cored arc welding of Grade 300 reinforcing bars shall conform to the requirements of AWS A5.18 for ER70S-2, ER70S-3, ER70S-6 or ER70S-7 electrodes; or AWS A5.20 for E70T-1, E70T-5, E70T-6 or E70T-8 electrodes.

Electrodes for semiautomatic welding of ASTM Designation: A 615/A 615M, Grade 420 and ASTM Designation: A 706/A 706M bars shall produce a weld metal deposit with properties conforming to the requirements of Section 5.3.4 of AWS D1.1-96 for ER80S-Ni1, ER80S-Ni2, ER80S-Ni3, ER80S-D2, E90T1-K2 and E91T1-K2 electrodes.

Reinforcing bars shall be preheated for a distance of not less than 150 mm on each side of the joint prior to welding.

For all welding of ASTM Designation: A 615/A 615M, Grade 300 or Grade 420 bars, the requirements of Table 5.2, "Minimum Preheat and Interpass Temperatures," of AWS D1.4-92 are superseded by the following:

The minimum preheat and interpass temperatures shall be 200°C for Grade 300 bars and 300°C for Grade 420 bars. Immediately after completing the welding, at least 150 mm of the bar on each side of the splice shall be covered by an insulated wrapping to control the rate of cooling. The insulated wrapping shall remain in place until the bar has cooled below 90°C.

When welding different grades of reinforcing bars, the electrode shall conform to Grade 300 bar requirements and the preheat shall conform to the Grade 420 bar requirements.

In the event that any of the specified preheat, interpass and post weld cooling temperatures are not met, all weld and heat affected zone metal shall be removed and the splice rewelded.

All welding shall be protected from air currents, drafts, and precipitation to prevent loss of heat or loss of arc shielding. The method of protecting the welding area from loss of heat or loss of arc shielding shall be subject to approval by the Engineer.

Reinforcing bars shall not be direct butt spliced by thermite welding.

The first paragraph of Section 52-1.08C, "Mechanical Butt Splices," of the Standard Specifications is amended to read:

Mechanical butt splices shall be the sleeve-filler metal type, the sleeve-threaded type, the sleeve-swaged type, the sleeve-filler grout type, the sleeve-lockshear bolt type, the two-part sleeve-forged bar type, or the two-part sleeve-friction bar type, at the option of the Contractor.

The third paragraph of Section 52-1.08C, "Mechanical Butt Splices," of the Standard Specifications is amended to read:

The total slip of the reinforcing bars within the splice sleeve after loading in tension to 200 MPa and relaxing to 20 MPa shall not exceed the following, measured between gage points clear of the splice sleeve: 250 μ m for reinforcing bars No. 43, or smaller, or 750 μ m for reinforcing bars No. 57.

The following is added after the third paragraph of Section 52-1.08C, "Mechanical Butt Splices," of the Standard Specifications:

Slip requirements shall not apply to mechanical lap splices.

The fourth subparagraph of the last paragraph of Section 52-1.08C, "Mechanical Butt Splices," of the Standard Specifications is amended to read:

A statement that the splicing systems and materials used in accordance with the manufacturer's procedures will develop not less than the minimum tensile strengths, based on the nominal bar area, of 430 MPa for ASTM Designation: A 615/A 615M, Grade 300 bars and 550 MPa for ASTM Designations: A 615/A 615M, Grade 420 and A 706/A 706M bars, and will comply with the total slip requirements and the other requirements in these specifications.

Section 52-1.08C(5), "Sleeve-Extruded Mechanical Butt Splices," of the Standard Specifications is replaced with the following:

52-1.08C(5) Sleeve-Lockshear Bolt Mechanical Butt Splices.—The sleeve-lockshear bolt type of mechanical butt splices shall consist of a seamless steel sleeve, 2 serrated steel strips welded to the inside of the sleeve, center hole with centering pin, and bolts that are tightened until the bolt heads shear off and the bolt ends are embedded in the reinforcing bars.

52-1.08C(6) Two-Part Sleeve-Forged Bar Mechanical Butt Splices.—The two-part sleeve-forged bar type of mechanical butt splices shall consist of a shop machined two-part threaded steel sleeve that interlocks two hot-forged reinforcing bars ends. The forged bar ends may be either shop produced or field produced.

52-1.08C(7) Two-Part Sleeve-Friction Bar Mechanical Butt Splices.—The two-part sleeve-friction bar type of mechanical butt splices shall consist of a shop machined two-part threaded steel sleeve whose ends are friction welded, in the shop, to the reinforcing bars ends.

The fourth paragraph of Section 52-1.08D, "Qualification of Welding and Mechanical Splicing," of the Standard Specifications is replaced with the following:

Each operator qualification test for mechanical splices shall consist of 2 sample splices. Each mechanical splice procedure test shall consist of 2 sample splices.

For sleeve-filler, sleeve-threaded, sleeve-lockshear bolt and two-part sleeve friction bar mechanical butt splices, all sample splices shall be made on the largest reinforcing bar size to be spliced by the procedure or operator being tested except that No. 43 bars may be substituted for No. 57 bars.

For sleeve-swaged and two-part sleeve-forged mechanical butt splices, and mechanical lap splices, all sample splices shall be made on the largest reinforcing bar size of each deformation pattern to be spliced by the procedure or operator being tested. When joining new reinforcing bars to existing reinforcement, the qualification test sample bars shall be made with the deformation pattern of the new reinforcement to be joined.

Section 52-1.08E, "Job Control Tests," of the Standard Specifications is replaced with the following:

52-1.08E Job Control Tests.—When mechanical butt splices, shop produced complete joint penetration butt welded splices, or shop produced resistance butt welded splices are used, the Contractor shall furnish job control tests from a local qualified lab. A job control test shall consist of the fabrication, under conditions used to produce the splice, and the physical testing of 3 sample splices for each lot of 150 splices.

A lot of mechanical butt splices is defined as 150, or fraction thereof, of the same type of mechanical butt splices used for each combination of bar size and bar deformation pattern that is used in the work.

A lot of shop produced complete joint penetration butt welded splices, or shop produced resistance butt welded splices, is defined as 150, or fraction thereof, of the same type of welds used for each combination of bar size and bar deformation pattern that is used in the work.

When joining new reinforcing bars to existing reinforcement, the job control test shall be made with the deformation pattern of the new reinforcement to be joined.

A sample splice shall consist of a splice made at the job site to connect two 760 mm, or longer, bars using the same splice materials, position, location, and equipment, and following the same procedures as are being used to make splices in the work. Shorter sample splice bars may be used if approved by the Engineer.

Sample splices shall be made and tested in the presence of the Engineer or the Engineer's authorized representative.

Sample splices shall be suitably identified with weatherproof markings prior to shipment to the testing laboratory.

For sleeve-threaded mechanical butt splices, the reinforcing bars to be used for job control tests shall be fabricated on a random basis during the cutting of threads on the reinforcing bars of each lot and shipped to the job site with the material they represent.

For shop produced complete joint penetration butt welds, shop produced resistance butt welded splices and all types of mechanical butt splices, except the sleeve-threaded type, the Engineer will designate when samples for job control tests are to be fabricated, and will determine the limits of the lot represented by each job control test.

Should the average of the results of tests made on the 3 sample splices or should more than one sample splice in any job control test fail to meet the requirements for splices, all splices represented by that test will be rejected in accordance with the provisions in Section 6-1.04, "Defective Materials," of the Standard Specifications. This rejection shall prevail unless the Contractor, at the Contractor's expense, obtains and submits evidence, of a type acceptable to the Engineer, that the strength and quality of the splices in the work are acceptable.

Section 52-1.08F, "Nondestructive Splice Tests," of the Standard Specifications is replaced with the following:

52-1.08F Nondestructive Splice Tests.—All required radiographic examinations of complete joint penetration butt welded splices shall be performed by the Contractor in accordance with the requirements of AWS D 1.4 and these specifications.

Prior to radiographic examination, welds shall meet the requirements of Section 4.4, "Quality of Welds," of AWS D1.4-92.

Radiographic examinations shall be performed on 25 percent of all complete joint penetration butt welded splices from a production lot. The size of a production lot will be a maximum of 100 splices. The Engineer will select the splices which will compose the production lot and also the splices within each production lot to be radiographically examined.

Should more than 12 percent of the splices which have been radiographically examined in any production lot be defective, an additional 25 percent of the splices, selected by the Engineer from the same production lot, shall be radiographically examined. Should more than 12 percent of the cumulative total of splices tested from the same production lot be defective, all remaining splices in the lot shall be radiographically examined.

Additional radiographic examinations performed due to the identification of defective splices shall be at the Contractor's expense.

All defects shall be repaired in accordance with the requirements of AWS D1.4.

Radiographic examinations will not be required for either shop produced complete joint penetration butt welds or shop produced resistance butt welded splices of No. 25 or smaller bars used as spiral or hoop reinforcement.

In addition to radiographic examinations performed by the Contractor, any mechanical or welded splice may be subject to inspection or nondestructive testing by the Engineer. The Contractor shall provide sufficient access facilities in the shop and at the jobsite to permit the Engineer or his agent to perform the inspection or testing.

The Contractor shall notify the Engineer in writing 48 hours prior to performing any radiographic examinations.

The radiographic procedure used shall conform to the requirements of ASME Boiler and Pressure Vessels Code, Section V, Article 2 and the following:

Two exposures shall be made for each complete joint penetration butt welded splice. For each of the two exposures, the radiation source shall be centered on each bar to be radiographed. The first exposure shall be made with the radiation source placed at zero degrees from the top of the weld and perpendicular to the weld root and identified with a station mark of "0." When obstructions prevent a zero degree placement of the radiation source for the first exposure, and when approved in writing by the Engineer, the source may be rotated, around the centerline of the reinforcing bar, a maximum of 25 degrees. The second exposure shall be at 90 degrees to the "0" station mark and shall be identified with a station mark of "90."

For field produced complete joint penetration butt welds, no more than one weld shall be radiographed during one exposure. For shop produced complete joint penetration butt welds, if more than one weld is to be

radiographed during one exposure, the angle between the root line of each weld and the direction to the radiation source shall be not less than 65 degrees.

Radiographs shall be made by either X-ray or gamma ray. Radiographs made by X-ray or gamma rays shall have densities of not less than 2.3 nor more than 3.5 in the area of interest. A tolerance of 0.05 in density is allowed for densitometer variations. Gamma rays shall be from the iridium 192 isotope and the emitting specimen shall not exceed 4.45 mm in the greatest diagonal dimension.

The radiographic film shall be placed perpendicular to the radiation source at all times; parallel to the root line of the weld unless source placement determines that the film must be turned; and as close to the root of the weld as possible.

The minimum source to film distance shall be maintained so as to insure that all radiographs maintain a maximum geometric unsharpness of 0.020 at all times, regardless of the size of the reinforcing bars.

All penetrameters shall be placed on the source side of the bar and perpendicular to the radiation source at all times. One penetrameter shall be placed in the center of each bar to be radiographed, perpendicular to the weld root, and adjacent to the weld. Penetrameter images shall not appear in the weld area.

When radiography of more than one weld is being performed per exposure, each exposure shall have a minimum of one penetrameter per bar, or three penetrameters per exposure. When 3 penetrameters per exposure are used, one penetrameter shall be placed on each of the 2 outermost bars of the exposure, and the remaining penetrameter shall be placed on a centrally located bar.

An allowable weld buildup of 4 mm may be added to the total material thickness when determining the proper penetrameter selection. No image quality indicator equivalency will be accepted. Wire penetrameters or penetrameter blocks shall not be used.

Penetrameters shall be sufficiently shimmed using a radiographically identical material. Penetrameter image densities shall be a minimum of 2.0 and a maximum of 3.6.

All radiographic film shall be Class 1, regardless of the size of reinforcing bars.

Radiographs shall be free of film artifacts and processing defects, including, but not limited to, streaks, scratches, pressure marks, or marks made for the purpose of identifying film or welding indications.

Each splice shall be clearly identified on each radiograph and the radiograph identification and marking system shall be established between the Contractor and the Engineer before radiographic inspection begins. Film shall be identified by lead numbers only; etching, flashing, or writing in identifications of any type will not be permitted. Each piece of film identification information shall be legible and shall include, as a minimum, the following information: Contractor's name, date, name of nondestructive testing firm, initials of radiographer, contract number, part number, and weld number. The letter "R" and repair number shall be placed directly after the weld number to designate a radiograph of a repaired weld.

Radiographic film shall be developed within a time range of one minute less to one minute more than the film manufacturer's recommended maximum development time. Development on the jobsite will not be allowed.

Processing chemistry shall be done with a consistent mixture and quality, and processing rinses and tanks shall be clean to ensure proper results. Records of all developing processes and any chemical changes to the developing processes shall be kept and furnished to the Engineer upon request. The Engineer may request, at any time, that a sheet of unexposed film be processed in the presence of the Engineer to verify processing chemical and rinse quality.

All radiographs shall be interpreted and graded by a Level II or Level III technician who is qualified in accordance with the American Society for Nondestructive Testing's Recommended Practice No. SNT-TC-1A. The results of these interpretations shall be recorded on a signed certification and a copy kept with the film packet.

Technique sheets prepared in accordance with ASME Boiler and Pressure Vessels Code, Section V, Article 2 Section T-291 shall also contain the developer temperature, developing time, fixing duration and all rinse times.

All radiographic envelopes shall have clearly written on the outside of the envelope the following information: name of the Contractor's Quality Control Manager (QCM), name of the nondestructive testing firm, name of the radiographer, date, contract number, complete part description, and all included weld numbers or a report number, as detailed in the Contractor's Quality Control Plan (QCP). In addition, all innerleaves shall have clearly written on them the part description and all included weld numbers, as detailed in

10-1.32 REINFORCED CONCRETE PIPE

Reinforced concrete pipe shall conform to the provisions in Section 65, "Reinforced Concrete Pipe," of the Standard Specifications and these special provisions.

The relative compaction required below the pipe spring line for pipe in Method 1 backfill in trench, where the pipe is not within the traveled way or under embankment, shall be 90 percent, minimum.

Except as otherwise designated by classification on the plans or in the specifications, joints for culvert and drainage pipes shall conform to the plans or specifications for standard joints.

10-1.33 DUCTILE IRON PIPE

This work shall consist of furnishing and installing ductile iron pipe with all necessary fittings and coupling systems, as shown on the plans or as determined by the Engineer in accordance with these special provisions.

The ductile iron pipe shall comply with AWWA C 151.

Excavation, backfill, and shaped bedding shall conform to the provisions in Section 19-3, "Structure Excavation and Backfill". The relative compaction required below the pipe spring line for pipe in Method 1 backfill in trench, where the pipe is not within the traveled way or under embankment, shall be 90 percent, minimum.

Ductile iron pipe shall be laid in a trench excavated to the lines and grades established by the Engineer. The bottom of the trench shall be graded and prepared to provide a firm and uniform bearing throughout the entire length of the pipe.

Ductile iron pipe shall be laid and jointed in accordance with generally accepted practice and the following provisions in order to be suitable for the purpose intended. Necessary facilities shall be provided for lowering and properly placing the sections of pipe in the trench. The pipe shall be laid to line and grade with the sections closely jointed. Every precaution shall be taken to prevent flooding the pipe trench before backfilling operations. Ductile iron pipe shall be connected to existing or new drainage facilities as shown on the plans.

The contract price paid per meter for ductile iron pipe shall include full compensation for furnishing all fittings, flexible couplings, labor, materials, tools, equipment, and incidentals and for doing all the work involved in installing ductile iron pipe, complete in place, as shown on the plans, as specified in these special provisions and as directed by the Engineer.

10-1.34 50mm PLASTIC PIPE

Conduit to be installed underground shall be Type 3 unless otherwise specified.

When Type 3 conduit is placed in a trench (not in pavement or under portland cement concrete sidewalk), after the bedding material is placed and the conduit is installed, the trench shall be backfilled with commercial quality concrete, containing not less than 250 kg of portland cement per cubic meter, to not less than 100 mm above the conduit before additional backfill material is placed.

At locations where conduit is required to be installed under pavement and existing underground facilities require special precautions, as described in "Obstructions" of these special provisions, conduit shall be placed by the "Trenching in Pavement Method" as specified in Section 86-2.05C, "Installation," of the Standard Specifications.

The contract price paid per meter for 50 millimeter plastic pipe shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all work involved in installing 50 millimeter plastic pipe, complete in place, as shown on the plans, as specified in these special provisions and as directed by the Engineer.

10-1.35 ALTERNATIVE PIPE

Alternative pipe culverts shall conform to the provisions in Section 62, "Alternative Culverts," of the Standard Specifications and these special provisions.

SPIRAL RIB PIPE.--Spiral rib pipe shall meet the requirements for corrugated aluminum pipe; corrugated aluminized steel pipe, Type II; or corrugated steel pipe in Section 66, "Corrugated Metal Pipe," of the Standard Specifications, except for profile and fabrication requirements.

Spiral rib pipe shall, at the option of the Contractor, consist of either one rectangular rib spaced midway between seams or 2 rectangular ribs and one half-circle rib equally spaced between seams. All ribs shall be continuous helical ribs that project outward from the surface of the pipe. On single rib pipe the rib shall be 19 mm wide by 19 mm high and the maximum rib pitch shall be 191 mm. On the two rectangular rib with one half-circle rib pipe, rectangular ribs shall be 19 mm wide by 25 mm high. The half-circle rib diameter shall be 13 mm and shall be spaced midway between the rectangular ribs and the maximum rib pitch shall be 292 mm. Rib pitch measured at right angles to the direction of the ribs may vary ± 13 mm.

Corrugated steel spiral rib pipe shall be fabricated by a continuous helical lock seam fabricated in accordance with the requirements in Section 66-3.03C(1), "Fabrication by Continuous Lock Seam," of the Standard Specifications.

Corrugated aluminum spiral rib pipe shall be fabricated by a continuous helical lock seam fabricated in accordance with the requirements in Section 66-2.03B, "Fabrication by Continuous Helical Lock Seam," of the Standard Specifications.

Coupling bands for spiral rib pipe shall conform to the requirements in Section 66-1.07, "Coupling Bands," of the Standard Specifications. Any coupling band shown on the plans or approved by the Engineer in accordance with Section

61-1.02, "Performance Requirements for Culvert and Drainage Pipe Joints," of the Standard Specifications, for use on a pipe corrugation of 68 mm x 13 mm for corrugated metal pipe may be used on spiral rib pipe having 68 mm x 13 mm rerolled annular ends. The width of band (W) for hat bands for pipe sizes larger than 1200 mm in diameter shall be 95 mm.

The contract price paid per meter to construct alternative pipe shall include, but not be limited to, sawcutting the existing pavement excavating the trench, shoring the trench, protecting the existing utilities, placing the alternative pipe, backfilling the trench and restoring the existing street section with equal or better quality, complete in place, as shown on the plans, as specified in these special provisions and as directed by the Engineer.

PLASTIC PIPE

Plastic pipe shall conform to the provisions in Section 64, "Plastic Pipe," of the Standard Specifications.

The contract price paid per meter to construct alternative pipe shall include, but not be limited to, sawcutting the existing pavement excavating the trench, shoring the trench, protecting the existing utilities, placing the alternative pipe, backfilling the trench and restoring the existing street section with equal or better quality, complete in place, as shown on the plans, as specified in these special provisions and as directed by the Engineer.

10-1.36 CORRUGATED METAL PIPE

Corrugated steel pipe (smooth) culverts shall conform to the provisions in Section 66, "Corrugated Metal Pipe," of the Standard Specifications and these special provisions.

Asphaltic mastic coating or polymeric coating substituted for bituminous coating shall be placed on the outside and inside surfaces of the pipe.

Except as otherwise designated by classification on the plans or in the specifications, joints for culvert and drainage pipes shall conform to the plans or specifications for standard joints.

Corrugated steel pipe shall be fabricated from zinc-coated steel sheet.

Corrugated steel pipe (smooth) is defined as a corrugated steel pipe with smooth inside surface which has manufactured suggested Manning's n value of 0.012 or less.

Universal coupling bands constructed with dimples, as shown on the standards plans, shall not be used in the work, except as otherwise provided herein.

When any corrugated steel pipe has been cut in the field, the connections shall be made with a coupling band and a portland cement concrete collar. The coupling band shall be the universal type constructed with dimples or the helical type.

The contract price paid per meter to construct alternative pipe shall include, but not be limited to, sawcutting the existing pavement excavating the trench, shoring the trench, protecting the existing utilities, placing the alternative pipe, backfilling the trench and restoring the existing street section with equal or better quality, complete in place, as shown on the plans, as specified in these special provisions and as directed by the Engineer.

10-1.37 RCP PIPE RISERS

Pipe risers shall conform to the provisions in Section 70, "Miscellaneous Facilities," of the Standard Specifications and these special provisions.

Pipe risers will be measured and paid for as reinforced concrete pipe.

10-1.38 OVERSIDE DRAINS

Alternative pipe downdrains shall conform to the requirements in Section 69, "Overside Drains," of the Standard Specifications for the kind of alternative pipe downdrain installed.

Overside downdrain will be measured and paid for under the provisions of asphalt concrete and alternative pipe. Required taper sections will be measured and paid for under the provisions of alternative pipe and equal to the immediate downstream pipe size.

10-1.39 MISCELLANEOUS FACILITIES

Flumes, and junction structures shall conform to the provisions in Section 70, "Miscellaneous Facilities," of the Standard Specifications and these special provisions.

Flumes shall be either prefabricated fiberglass inserts, or cast-in-place concrete. The Contractor shall submit shop drawings and obtain Engineer's approval prior to installation of the flume unit.

1. Parshall Flumes with a throat width of 75 millimeters or greater.
2. Palmer-Bowlus Flumes with a length greater than 1.0 meters
3. Trapezoidal Flumes with a throat width of 300 millimeters or greater.

The stiffeners shall be joined together at the knee to form a rigid dimensionally stable flume.

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AS-CONSTRUCTED

The flume shall be provided with anchoring clips fastened along the side of the flume to be used for anchorage into the concrete. Stiffeners made of fiberglass reinforced polyester angle/channel shall be provided across the top of the flume to provide structural support during shipping and installation.

Prefabricated fiberglass flumes shall be installed as specified under the Manufacturer's Specifications.

Cast-in-Place flumes shall conform to the provisions in Section 90, "Portland Cement Concrete" of the Standard Specifications. Cast-in-place flumes shall be constructed to the grades and line shown on the plans and be within 7 mm of the plan dimensions.

Flumes, and junction structures shall be constructed to the grade and line shown on the plans. The unit price paid for each of these facilities shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing, completing in place, as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

10-1.40 BEST MANAGEMENT PRACTICE (BMP)

Best Management Practice (BMP) systems, including compost filter BMP, Type I & II sand filter BMP, Bio-filter swale BMP, Bio-filter strip BMP, and infiltration trench BMP shall be constructed to grade and line shown on the plans.

10-1.40A COMPOST FILTER UNITS

shall be completed conforming to the following provisions:

1 PRECAST FILTER UNIT

Precast filter unit shall conform to the following provisions:

The Contractor shall submit shop drawings and obtain Engineer's approval prior to installation of the filter unit. Operation and maintenance manual shall be submitted to the Engineer.

1.1 FLOWKIT COMPONENTS

1.1.1 Filter Media

- (4) Filter media shall be by Stormwater Management or approved alternate.

1.1.2 Filter Cartridge

- (2) Cartridges shall have filter media installed (see specification above).

1.1.3 Weirs: Shall be constructed of PVC by Stormwater Management or approved alternate.

1.1.5 Flow Spreader: Shall be constructed of fiberglass or spun LDPE.

- 1.1.6 Slide Gate Valve: Shall be constructed of PVC with stainless steel shaft and aluminum handle.

1.2. PRECAST CONCRETE VAULT COMPONENTS

1.2.1 Precast Concrete Vault: Shall be provided according to ASTM C858-83.

1.2.2 Vault Joint Sealant: Shall be Con Seal CS-101 or Engineer approved.

1.2.4 Ladder: Bolt-on ladder shall be Type 316 Stainless Steel. Pull up ladder extender shall extend a minimum of 600 mm above the top rung of ladder.

1.3 OTHER COMPONENTS

- 1.3.1 Concrete (for concrete not covered by pre-cast specification above): Shall be 25 MPa, 28 day strength, 19.05 mm round rock, 101.6 slump maximum, placed within 90 minutes of initial mixing.
- 1.3.2 Silicone Sealant: Shall be pure RTV silicone conforming to Federal Specification Number TT S001543A or TT S00230C or Engineer approved.

1.4. EXECUTION

1.4.1 PRECAST CONCRETE VAULT

- (2) Contractor to grout all inlet and outlet pipes flush with vault interior wall. Contractor to grout interior walls.
- (3) Sanded PVC fittings shall be used on all PVC inlet and outlet pipes.

1.4.2 FILTER CARTRIDGE

Cartridges shall not be installed until the project site is clean and stabilized. All impermeable surfaces shall be clean and free of dirt and debris. All catch basins, manholes and pipes shall be free of dirt and sediments.

- 1.4.4 CLEANUP: Remove all excess materials, rocks, roots, or foreign material, leaving the site in a clean, complete condition approved by the Engineer. All PVC and fiberglass filter components shall be free of any foreign materials including concrete and excess sealant.

PVC PIPING: Shall be joined in accordance with ASTM D2564.

- 1.4.6 RESTORATION: Existing facilities, pavement, and base not to be removed as shown on the plans or specified elsewhere shall be restored to original condition.

2. CAST-IN-PLACE FILTER UNIT

Cast-in-place filter unit shall conform to the following provisions:

The Contractor shall submit shop drawings and obtain Engineer's approval prior to installation of the filter unit. Operation and maintenance manual shall be submitted to the Engineer.

2.1 FLOW KIT COMPONENTS

2.1.1 Filter Media

- (1) Filter media shall be made exclusively of fallen deciduous leaves with less than 5% by dry weight of woody or green yard debris materials.
- (2) Filter media shall be granular and shall contain less than 0.5% foreign material such as glass or plastic contaminants. Media shall be dry at the time of installation with a moisture content (wet weight basis) no greater 10%.
- (3) Maximum level of dust for filter media shall be defined as: media passing through a Sieve Size of 4.75 mm shall have no more than 10% (by mass of dry media) passing a Sieve Size of 425µm.
- (4) Filter media shall be by Stormwater Management or approved alternate.

2.1.2. Filter Cartridge

- (1) Cartridges shall be constructed from linear low density polyethylene bottom, top, and inner ring. Outer screen shall consist of 12.7 mm x 12.7 mm or 12.7 mm x 25.4 mm galvanized welded wire (1.6 mm gage minimum) bonded to PVC. Screen fasteners to be aluminum or stainless steel. Internal fittings shall consist of ABS fittings, PVC inner core with a siphon device consisting of a polystyrene float, polypropylene ball valve, with stainless steel connectors. Outer filter fabric shall be fiberglass 254 mm

x 215.9 mm clear mesh. Inner filter fabric shall be woven polyethylene with a Sieve Size of 850 µm. All miscellaneous screws, nuts, and fasteners to be stainless steel or engineer approved. All water tight fittings to be sealed with Sealant in conformance with FDA Regulation 21 CFR 175.000.

(2) Cartridges shall have filter media installed (see specification above).

2.1.3 Flow Spreader: Shall be constructed of LDPE by Stormwater Management or approved alternate.

2.1.4 PVC Piping (inside filter): All internal PVC piping and fittings shall meet ASTM D1785.

2.1.5 Slide Gate Valve: Shall be constructed of PVC with stainless steel shaft and aluminum handle.

2.1.7. Hardware: Shall be stainless steel.

2.2 OTHER COMPONENTS

2.2.2. Silicone Joint Sealant

Silicone sealant shall be pure RTV silicone conforming to Federal Specification Number TT S001543A or TT S00230C or Engineer approved.

2.2.3 Sub-Base

Sub-base shall be 152.4 mm minimum of 19.0 mm minus rock, 95% compaction. Compact undisturbed sub-grade materials to 95% of maximum density at +/- 2% of optimum moisture content. Unsuitable material below sub-grade shall be replaced to site engineer's approval

2.2.4. Backfill

Backfill shall be 19.0 mm minus rock (95% compaction), or as otherwise specified in the project's general technical specifications.

2.2.5. Grating

All grating shall be Type 316 Stainless Steel.

2.2.6 Grout

Cement-type grout shall be non-shrink grout meeting the requirements of Corps of Engineers CRD-C588. Specimens molded, cured and tested in accordance with ASTM C-109 shall have minimum compressive strength of 35 MPa Grout shall not exhibit visible bleeding.

2.2.7. Doors

Doors: Shall be Type 316 Stainless Steel covers with recessed lift handle and a locking latch with 9.5 mm pentahead bolts. Pentahead key to be provided for filter doors.

2.2.8. Ladder

Bolt-on ladder shall have a hot dipped galvanized finish. Pull up ladder extender shall extend a minimum of 600 mm above the top rung of ladder.

2.2.9. Cast-In-Place Concrete and Reinforcement

(1) Concrete shall be 25 MPa, 28 day strength, 19.0 mm crushed rock, 100 mm slump maximum, placed within 90 minutes of initial mixing.

(2) Reinforcement steel to be 4230 KPa deformed, free of rust and clean.

(3) Precast concrete alternative is acceptable.

2.2.10. 3-Sided Precast Concrete Cover

- (1) Precast 3-sided cover to be designed in accordance with the "Standard Specifications for Highway Bridges" adopted by the American Association of State Highway Transportation Officials, 1992.
- (2) Cast-In-Place alternative is acceptable. Contractor to provide sealed structural drawings for review by Engineer.

2.3 EXECUTION

2.3.1 FILTER CARTRIDGE

Cartridges shall not be installed until the project site is clean and stabilized. The project site includes any surface which contributes storm drainage to the filter. All impermeable surfaces shall be clean and free of dirt and debris. All catch basins, manholes and pipes shall be free of dirt and sediments.

2.3.2 WEIRS: shall be level and sealed at all joints with silicone sealant. Sealant shall be worked into joint from both sides.

2.3.3 CLEANUP: Remove all excess materials, rocks, roots, or foreign material, leaving the site in a clean, complete condition approved by the Engineer. All PVC and fiberglass filter components shall be free of any foreign materials including concrete and excess sealant.

2.3.4 FLOW SPREADER FRAMES: Shall be installed within 10 mm of plan dimensions and set vertically.

2.3.5 PVC PIPING: Shall be joined in accordance with ASTM D2564.

2.3.6 CAST-IN-PLACE CONCRETE FINISHING

- (1) Unexposed Wall Finish - Patch all rock pockets, form tie holes, and other irregularities with mortar. No further finishing will be required.
- (2) Ordinary Wall Finish - Immediately after removal of forms, patch or point up all defects and cure patches to a point 150 mm below exposed grade. After pointings have set sufficiently, grind or fill all form marks and pointings to give a smooth surface even with the flat wall surface.
- (3) Horizontal Surfaces

Finish upper horizontal surfaces such as tops of walls by placing an excess of concrete in the forms and removing or striking off such excess with a wooden float and forcing coarse aggregate below mortar surface. The use of mortar topping for surfaces falling under this classification will not be permitted.

After concrete has been struck off, work surface thoroughly and float with a wooden, canvas or cork float, by skilled and experienced concrete finishers. Before this last finish has set, broom surface lightly, parallel to the long dimension, with a fine brush to remove surface cement film leaving a fine-grained, smooth, but sandy texture.

3. LINEAR FILTER UNIT

Cast-in-place filter unit shall conform to the following provisions:

The Contractor shall submit shop drawings and obtain Engineer's approval prior to installation of the filter unit. Operation and maintenance manual shall be submitted to the Engineer.

3.1 FLOW KIT COMPONENTS

3.1.1 All flow kit components are provided by Stormwater Management or approved alternate

3.1.2. Filter Media

- (1) Filter media shall be made exclusively of fallen deciduous leaves with less than 5% by dry weight of woody or green yard debris materials.

- (2) Filter media shall be granular and shall contain less than 0.5% foreign material such as glass or plastic contaminants. Media shall be dry at the time of installation with a moisture content (wet weight basis) no greater 10%.
- (3) Maximum level of dust for filter media shall be defined as: media passing through a Sieve Size of 4.75 mm shall have no more than 10% (by mass of dry media) passing a Sieve Size of 425µm.
- (4) Filter media shall be by Stormwater Management or approved alternate.

3.1.3. Filter Cartridge

- (1) Cartridges shall be constructed from linear low density polyethylene bottom, top, and inner ring. Outer screen shall consist of 12.7 mm x 12.7 mm or 12.7 mm x 25.4 mm galvanized welded wire (1.6 mm gage minimum) bonded to PVC. Screen fasteners to be aluminum or stainless steel. Internal fittings shall consist of ABS fittings, PVC inner core with a siphon device consisting of a polystyrene float, polypropylene ball valve, with stainless steel connectors. Outer filter fabric shall be fiberglass 254 mm x 215.9 mm clear mesh. Inner filter fabric shall be woven polyethylene with a Sieve Size of 850 µm. All miscellaneous screws, nuts, and fasteners to be stainless steel or engineer approved. All water tight fittings to be sealed with Sealant in conformance with FDA Regulation 21 CFR 175.000.
- (2) Cartridges shall have filter media installed (see specification above).

3.2 PRECAST CONCRETE VAULT COMPONENTS

Precast Concrete Vault: Shall be provided according to ASTM C858-83.

Vault Joint Sealant: Shall be Conseal CS-101 or Engineer approved.

3.3 OTHER COMPONENTS

- (1) Concrete (for concrete not covered by pre-cast specification above): Shall be 25 MPa, 28 day strength, 19.0 mm round rock, 100 mm slump maximum, placed within 90 minutes of initial mixing.
- (2) Silicone Sealant: Shall be pure RTV silicone conforming to Federal Specification Number TT S001543A or TT S00230C or Engineer approved.
- (3) Grout: Shall be non-shrink grout meeting the requirements of Corps of Engineers CRD-C588. Specimens molded, cured and tested in accordance with ASTM C-109 shall have minimum compressive strength of 35 MPa Grout shall not exhibit visible bleeding.
- (4) Sub-Base: Shall be 150 mm minimum of 19.0 mm minus rock, 95% compaction. Compact undisturbed sub-grade materials to 95% of maximum density at +/- 2% of optimum moisture content. Unsuitable material below sub-grade shall be replaced to site engineer's approval.
- (5) Backfill: Shall be 19.0 mm minus rock (95% compaction), or as otherwise specified in the projects general technical specifications.

3.4 EXECUTION

3.4.1 PRECAST CONCRETE VAULT

- (1) Vault floor shall slope 6.35 mm (max.) across the width and slope downstream 25.4 mm per 731.52 cm of length. Vault top finish grade shall be even with surrounding finish grade surface unless otherwise noted on plans.
- (2) Contractor to grout all inlet and outlet pipes flush with vault interior wall. Contractor to grout interior walls.
- (3) Sanded PVC fittings shall be used on all PVC inlet and outlet pipes.

3.4.2 FILTER CARTRIDGE

Cartridges shall not be installed until the project site is clean and stabilized. The project site includes any surface that contributes storm drainage to the filter. All impermeable surfaces shall be clean and free of dirt and debris. All catch basins, manholes and pipes shall be free of dirt and sediments.

3.4.4 CLEANUP: Remove all excess materials, rocks, roots, or foreign material, leaving the site in a clean, complete condition approved by the Engineer. All PVC and fiberglass filter components shall be free of any foreign materials including concrete and excess sealant.

3.4.5 RESTORATION: Existing facilities, pavement, and base not to be removed as shown on the plans or specified elsewhere shall be restored to original condition.

3.4.6 PVC PIPING: Shall be joined in accordance with ASTM D2564.

The contract price paid per unit for the compost filter BMP shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the miscellaneous work, excavation, backfill, testing, protection of existing utilities, asphalt concrete and aggregate base removal and replacement including materials, handrailing material and installation, hauling and clean up, and restoration involved in constructing the filter units, complete in place, as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

10-1.40B SAND FILTER TYPE I

4. CAST-IN-PLACE FILTER UNIT

Cast-in-place filter unit shall conform to the following provisions:

The Contractor shall submit shop drawings and obtain Engineer's approval prior to installation of the filter unit.

4.1 FILTER CHAMBER COMPONENTS

4.1.1 Filter Media

(1) Filter media shall be composed of a 460 mm sand layer above a 305 mm layer of gravel.

(2) The filter sand shall conform to the provisions in Section 68-1.023 "Permeable Materials" of the Standard Specifications. Filter sand shall be clean and free from any organic matter and other deleterious materials. The aggregate shall meet the following gradation:

Sieve Size	Percentage Passing
1mm	100%
600µm	100% - 90%
425µm	60% - 50%
150µm	0% - 10%
75µm	0% - 5%

(3) The filter gravel shall conform to the provisions of Class 1, Type B, provisions in Section 68-1.023 "Permeable Materials" of the Standard Specifications.

(4) Filter fabric shall be placed between the sand and gravel interface. The filter fabric shall have a minimum of 150 mm overlap. The filter fabric shall conform to the following standards:

Property	Test Method	Unit	Specification
Material Unit Weight		Grams/m ²	678

Flow Rate		(m ³ /s)/m ²	0.122 minimum
Permeability	ASTM D-2434	Cm/s	12.4 x 10 ⁻²
Grab Strength	ASTM D-1682	N	Dry Lg.400 Dry Wd: 311 Wet Lg.423 Wet Wd: 311
Puncture Strength	COE CW-02215	N	186 minimum
Mullen Burst Strength	ASTM D-1117	KPa	965 minimum
Equivalent Opening Size	Sieve Size	µm	150 (212-106)

4.2 OTHER COMPONENTS

4.2.1. Silicone Joint Sealant

Silicone sealant shall be pure RTV silicone conforming to Federal Specification Number TT S001543A or TT S00230C or Engineer approved.

4.2.2. Excavation

4.2.3. Sub-Base

Sub-base shall be 150 mm minimum of 19.0 mm minus rock, 95% compaction. Compact undisturbed sub-grade materials to 95% of maximum density at +/- 2% of optimum moisture compacted. Unsuitable material below sub-grade shall be replaced to site engineer's approval

4.2.4. Backfill

Backfill shall be 19.0 mm minus rock (95% compaction), or as otherwise specified in the project's general technical specifications.

4.2.5. Grating and Frame

All components for the grating and frame shall be Type 316 ~~Stainless Steel~~ Stainless Steel, or epoxy coated steel per Sections 75 and 95 of the Standard Specifications.

4.2.6. Grout

Cement-type grout shall be non-shrink grout meeting the requirements of Corps of Engineers CRD-C588. Specimens molded, cured and tested in accordance with ASTM C-109 shall have minimum compressive strength of 35 MPa Grout shall not exhibit visible bleeding.

4.2.7. Cast-In-Place Concrete and Reinforcement

- (1) Concrete shall be 25 MPa, 28 day strength, 19.0 mm crushed rock, 100 mm slump maximum, placed within 90 minutes of initial mixing.
- (2) Reinforcement steel to be 4230 KPa deformed, free of rust and clean.

4.2.8. Perforated Riser and Underdrain

- (1) Perforated Riser shall conform to Standard Specifications Section 68-1.02K Perforated Plastic Pipe. The perforation diameter, spacing, and perforations per row shall conform to the dimensions as shown on the plans.
- (2) Perforated Riser shall be strapped at 600 mm intervals. Straps shall be either ~~stainless steel~~ Stainless Steel, or epoxy coated steel per Sections 75 and 95 of the Standard Specifications. or PVC.

4.2.9 Debris Cage shall be ~~stainless steel~~ Stainless Steel, or epoxy coated steel per Sections 75 and 95 of the

Contract No. 43A0004A

AS-BUILT

Contract No. 11-059104, CCO No. 8

AS-CONSTRUCTED

Standard Specifications, 50 mm x 50 mm Welded Wire Mesh with a 3 mm diameter Wire.

4.2.10. Gate Valve

Gate Valve shall be a threaded or ring type PVC valve and shall be able to withstand a cold water working pressure of 500 kPa. Gate valves shall be of the same size as the pipeline which the valve serves, unless otherwise shown on the plans.

4.2.11. Rock Slope Protection

Rock Slope Protection shall conform to the provisions in Section 72 "Slope Protection" of the Standard Specifications and these special provisions.

4.3 EXECUTION

4.3.1 FILTER MEDIA

Filter Media shall not be installed until the project site is clean and stabilized. The project site includes any surface, which contributes storm drainage to the filter. All impermeable surfaces shall be clean and free of dirt and debris. All catch basins, manholes and pipes shall be free of dirt and sediments.

4.3.2 WEIRS: shall be level and sealed at all joints with silicone sealant. Sealant shall be worked into joint from both sides.

4.3.3 CLEANUP: Remove all excess materials, rocks, roots, or foreign material, leaving the site in a clean, complete condition approved by the Engineer. All PVC and fiberglass filter components shall be free of any foreign materials including concrete and excess sealant.

4.3.4 RESTORATION: Existing facilities and pavement not to be removed as shown on the plans or specified elsewhere shall be restored to original condition.

4.3.5 ~~4.3.5~~ PVC PIPING: Shall be joined in accordance with ASTM D2564.

4.3.6 Handrailing shall conform to the provisions in Section 83-1, "Railings," of the Standard Specifications and these section 10-4.1 of these special provisions.1.

4.3.6 CAST-IN-PLACE CONCRETE FINISHING

- (1) Unexposed Wall Finish - Patch all rock pockets, form tie holes, and other irregularities with mortar. No further finishing will be required.
- (2) Ordinary Wall Finish - Immediately after removal of forms, patch or point up all defects and cure patches to a point 150 mm below exposed grade. After pointings have set sufficiently, grind or fill all form marks and pointings to give a smooth surface even with the flat wall surface.
- (3) Horizontal Surfaces

Finish upper horizontal surfaces such as tops of walls by placing an excess of concrete in the forms and removing or striking off such excess with a wooden float and forcing coarse aggregate below mortar surface. The use of mortar topping for surfaces falling under this classification will not be permitted.

After concrete has been struck off, work surface thoroughly and float with a wooden, canvas or cork float, by skilled and experienced concrete finishers. Before this last finish has set, broom surface lightly, parallel to the long dimension, with a fine brush to remove surface cement film leaving a fine-grained, smooth, but sandy texture.

The contract price paid per unit for the sand filter Type I BMP shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the miscellaneous work, excavation, backfill, testing, protection of existing utilities, asphalt concrete and aggregate base removal and replacement including materials protection and replacement of existing surrounding landscaping, final grading, clean up, and restoration involved in

constructing the sand filter units, handrailing, material and installtaion complete in place, as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

10-1.40C SAND FILTER TYPE II

5. CAST-IN-PLACE FILTER UNIT

Cast-in-place filter unit -shall conform to the following provisions:

The Contractor shall submit shop drawings and obtain Engineer's approval prior to installation of the filter unit.

5.1 FILTER CHAMBER FLOW KIT COMPONENTS

5.1.1 Filter Media

- (1) Filter media shall be composed of an 300 mm sand layer above a 150 mm layer of gravel.
- (2) The filter sand shall be concrete sand in conformance with AASHTO M6 standards or equivalent.
- (3) The filter gravel shall be washed gravel in conformance with "Permeable Materials" Standard Specifications Section 68-1.023. The aggregate shall meet the following gradation:

Sieve Size	Percentage Passing
37.5 mm	100%
25 mm	100% - 90%
19 mm	85% - 50%
12.5 mm	40% - 20%
4.75 mm	0% - 10%
2.36 mm	0% - 5%

- (3) Filter fabric shall be placed around the entire gravel layer. The filter fabric shall have a minimum of 150mm overlap. The filter fabric shall conform to Standard Specification Section 88-1.03 Filter Fabric.

5.2 OTHER COMPONENTS

5.2.1. Excavation

5.2.2. Silicone Joint Sealant

Silicone sealant shall be pure RTV silicone conforming to Federal Specification Number TT S001543A or TT S00230C or Engineer approved.

5.2.3 Sub-Base

Sub-base shall be 150 mm minimum of 19.0 mm minus rock, 95% compaction. Compact undisturbed sub-grade materials to 95% of maximum density at +/- 2% of optimum moisture compaction. Unsuitable material below sub-grade shall be replaced to site engineer's approval

5.2.4. Backfill

Backfill shall be 19.0 mm minus rock (95% compaction), or as otherwise specified in the project's general technical specifications.

5.2.5. Grating and Frame

All components for the grating and frame shall be ~~stainless steel~~ Stainless Steel, or epoxy coated steel per Sections 75 and 95 of the Standard Specifications. Stainless Steel shall conform to ASTM Standards 316.

5.2.6. Grout

Cement-type grout shall be non-shrink grout meeting the requirements of Corps of Engineers CRD-C588. Specimens molded, cured and tested in accordance with ASTM C-109 shall have minimum compressive strength of 35 MPa. Grout shall not exhibit visible bleeding.

5.2.7. Watertight Gasket

Watertight Gaskets shall conform to the provisions in order to be suitable for the purposes intended.

5.2.8. Cast-In-Place Concrete and Reinforcement

- (1) Concrete shall be 25 MPa, 28 day strength, 19.0 mm crushed rock, 100 mm slump maximum, placed within 90 minutes of initial mixing.
- (2) Reinforcement steel to be 4230 KPa deformed, free of rust and clean.

5.3 EXECUTION

5.3.1 FILTER MEDIA

Filter Media shall not be installed until the project site is clean and stabilized. The project site includes any surface which contributes storm drainage to the filter. All impermeable surfaces shall be clean and free of dirt and debris. All catch basins, manholes and pipes shall be free of dirt and sediments.

5.3.2 WEIRS: shall be level and sealed at all joints with silicone sealant. Sealant shall be worked into joint from both sides.

5.3.3 CLEANUP: Remove all excess materials, rocks, roots, or foreign material, leaving the site in a clean, complete condition approved by the Engineer. All PVC and fiberglass filter components shall be free of any foreign materials including concrete and excess sealant.

5.3.4 RESTORATION: Existing facilities and pavement not to be removed as shown on the plans or specified elsewhere shall be restored to original condition..

PVC PIPING: Shall be joined in accordance with ASTM D2564.

5.3.6 Gate Valve

Gate Valve shall be a threaded or ring type PVC valve and shall be able to withstand a cold water working pressure of 500 kPa. Gate valves shall be of the same size as the pipeline which the valve serves, unless otherwise shown on the plans.

5.3.7 CAST-IN-PLACE CONCRETE FINISHING

- (1) Unexposed Wall Finish - Patch all rock pockets, form tie holes, and other irregularities with mortar. No further finishing will be required.
- (2) Ordinary Wall Finish - Immediately after removal of forms, patch or point up all defects and cure patches to a point 150 mm below exposed grade. After pointings have set sufficiently, grind or fill all form marks and pointings to give a smooth surface even with the flat wall surface.

(3) Horizontal Surfaces

Finish upper horizontal surfaces such as tops of walls by placing an excess of concrete in the forms and removing or striking off such excess with a wooden float and forcing coarse aggregate below mortar surface. The use of mortar topping for surfaces falling under this classification will not be permitted.

After concrete has been struck off, work surface thoroughly and float with a wooden, canvas or cork float, by skilled and experienced concrete finishers. Before this last finish has set, broom surface lightly, parallel to the long dimension, with a fine brush to remove surface cement film leaving a fine-grained, smooth, but sandy texture.

The contract price paid per unit for the sand filter Type II BMP shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the miscellaneous work, excavation, backfill, testing, protection of existing utilities, asphalt concrete and aggregate base removal and replacement including materials protection and replacement of existing surrounding landscaping, final grading, clean up, and restoration involved in constructing the sand filter units, complete in place, as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

10-1.40D BIOFILTER SWALE

6. BIOFILTER SWALE UNIT

Biofilter Swale unit shall conform to the following provisions:

6.1 DITCH EXCAVATION

6.1.1 Ditch Excavation shall conform to the provisions in Section 19 "Earthwork" of the Standard Specifications and these special provisions.

6.2 BIO-FILTER SALTGRASS SOD PLANTING AND MAINTENANCE

6.2.1 Soil Preparation

A. Roughen soil surface, in areas where soil is compacted, particularly on graded cut surfaces.

B. Using manual or mechanical methods, thoroughly roughen soil to a depth of two (2) to four (4) inches.

C. Rake soil surface smooth.

6.2.2 Saltgrass Sod Installation

- A. Prior to installing saltgrass sod from flats, if soil is not moist, water planting area to build moisture reserve in the soil to a depth of three (3) inches.
- B. Carefully remove saltgrass sod from flats so that sod comes out in one piece. Place the sod pieces side by side with a gap of approximately one (1) inch between sod pieces.
- C. Lay sod so that, after allowing for watering and setting, the surface level of each piece of sod is the same as the surrounding sod.
- D. Assure that sod does not dry out before or during planting. Keep roots moist at all times during planting operations.
- E. Fill in gaps between sod pieces with sand to the same level as the soil which the sod was grown. Gently tamp down sand to remove air pockets.
- F. Water saltgrass planting thoroughly, immediately after installation. Backfill any voids with additional sand.
- G. Commence maintenance of all saltgrass plantings immediately upon installation of any portion of the work, continuing up to and through the maintenance period.

6.2.3 Saltgrass Maintenance

- A. Maintain saltgrass in a vigorous, thriving condition by proper watering, weed control, fertilization, cleanup, general care and other necessary operations during the entire period of installation and establishment.
- B. Provide water as necessary to saltgrass plantings during the maintenance period. Determine frequency and amount of water applications by checking soil moisture levels on a regular and frequent basis. Apply water prior to wilting of saltgrass.
- C. Water only when necessary. Apply water in a manner that ensures deep penetration into the soils below the saltgrass root zone. Reduce watering frequency as saltgrass becomes established and during cool weather.
- D. During the first six (6) weeks after planting, use a hose or sprinkler to apply water in a gentle stream so as not to disturb the roots or displace the sand in the gaps between the sod pieces.
- E. After sod is established, the planting may be watered with a water truck if roots or sand are not disturbed and if the water truck can apply water in a manner that precludes runoff.
- F. If instructed, apply fertilizer to saltgrass plantings starting in the early spring and every three (3) months thereafter until saltgrass is well established. Apply a turf fertilizer at one-half the rate recommended by the manufacturer.
- G. Remove weed species as necessary during the maintenance period, before weeds reach twelve (12) inches in height and before ripening of seeds.
- H. Control weeds by pulling out by hand or using tools such as hoes. The stems of hoed plants shall be cut below ground level. The weed plant mass shall be removed from the site and disposed of properly.
- I. Mow saltgrass as needed to maintain desired height, but do not mow less than three (3) inches in heights

J. At no time shall Contractor apply pesticides or herbicides to any planted areas unless instructed in writing

6.3 EROSION CONTROL, SEEDING AND PLANTING

6.3.2.1 Seeding and Fertilizing for erosion control purposes for areas beyond the areas that are to be sodded shall conform to the provisions in Section 20, "Erosion Control and Highway Planting" of the Standard Specifications and these special provisions.

6.3.2 EROSION CONTROL (TYPE D)

Erosion control (Type D) shall conform to the provisions in Section 20-3, "Erosion Control," of the Standard Specifications and these special provisions.

Erosion control (Type D) work shall consist of applying erosion control materials to embankment and excavation slopes 1:4 (vertical:horizontal) or steeper, and other areas designated by the Engineer. Erosion control (Type D) shall be applied during November 15 and ending January 31 or, if the slope on which the erosion control is to be placed is finished during the winter season as specified in "Water Pollution Control" elsewhere in these special provisions the erosion control shall be applied immediately; or, if the slope on which the erosion control is to be placed is finished outside both specified periods and the contract work will be completed before November 15, the erosion control shall be applied as a last item of work.

Prior to installing erosion control materials, soil surface preparation shall conform to the provisions in Section 19-2.05, "Slopes," of the Standard Specifications, except that rills and gullies exceeding 50 mm in depth or width shall be leveled. Vegetative growth, temporary erosion control materials and other debris shall be removed from areas to receive erosion control.

6.3.2.2 Planting Materials shall conform to the provisions in Section 20-4.05, "Planting" of the Standard Specifications and these special provisions.

6.3 Materials - Materials shall conform to Section 20-2, "Materials," of the Standard Specifications and the following:

SEED.-Seed shall conform to the provisions in Section 20-2.10, "Seed," of the Standard Specifications. Individual seed species shall be measured and mixed in the presence of the Engineer.

Seed not required to be labeled under the California Food and Agricultural Code shall be tested for purity and germination by a seed laboratory certified by the Association of Official Seed Analysts, or a seed technologist certified by the Society of Commercial Seed Technologists.

Seed shall have been tested for purity and germination not more than one year prior to application of seed.

Results from testing seed for purity and germination shall be furnished to the Engineer prior to applying seed.

LEGUME SEED.-Legume seed shall be pellet-inoculated or industrial-inoculated.

Pellet-inoculated seed shall be inoculated in accordance with the provisions in Section 20-2.10, "Seed," of the Standard Specifications.

Inoculated seed shall have a calcium carbonate coating.

Pellet-inoculated seed shall be sown within 90 days after inoculation.

Industrial-inoculated seed shall be inoculated with Rhizobia and coated using an industrial process by a manufacturer whose principal business is seed coating and seed inoculation.

Industrial-inoculated seed shall be sown within 180 calendar days after inoculation.

Legume seed shall consist of the following:

LEGUME SEED

<u>Botanical Name (Common Name)</u>	<u>Percent Germination (Minimum)</u>	<u>Kilograms pure live seed per hectare (Slope measurement)</u>
<u>Trifolium willdenovii (Tomcat Clover)</u>	<u>85</u>	<u>3.4</u>
<u>Lotus scoparius (Deerweed)</u>	<u>60</u>	<u>3.4</u>
<u>Lupinus bicolor (Miniature Lupine)</u>	<u>80</u>	<u>4.5</u>

NON-LEGUME SEED.-Non-legume seed shall consist of the following:

<u>NON-LEGUME SEED</u>		
<u>Botanical Name (Common Name)</u>	<u>Percent Germination (Minimum)</u>	<u>Kilograms pure live seed per hectare (Slope measurement)</u>
<u>Vulpia microstachys (Zorro Grass)</u>	<u>80</u>	<u>5.6</u>
<u>Hordeum californicum (California Barley)</u>	<u>80</u>	<u>11.25</u>

~~6.3.1 Seed shall conform to the provisions in Section 20-2.10, "Seed" of the Standard Specifications.~~

~~Individual seed species shall be measured and mixed in the presence of the Engineer.~~

- ~~(1) Seed not required to be labeled under the California Food and Agricultural Code shall be tested for purity and germination by a seed laboratory certified by the Association of Official Seed Analysts, or a seed technologist certified by the Society of Commercial Seed Technologists.~~

- ~~(2) Seed shall have been tested for purity and germination not more than one year period to application of seed.~~

- ~~(3) Seed shall have been tested for purity and germination not more than one year period to application of seed.~~

- ~~(4) Results from testing seed purity and germination shall be furnished to the Engineer prior to applying seed.~~

~~6.3.2 Legume Seed. Legume seed shall be pellet inoculated or industrial inoculated.~~

- ~~(1) Pellet inoculated seed shall be inoculated in accordance with the provisions in Section 20-2.10, "Seed", of the Standard Specifications. Inoculated seed shall have a calcium carbonate coating. Pellet Inoculated seed shall be sown within 90 days after inoculation.~~

- ~~(2) Industrial inoculated seed shall be inoculated with Rhizobia and coated using an industrial process by a manufacturer whose principal business is seed coating and seed inoculation. Industrial inoculated seed shall be sown within 180 calendar days after inoculation.~~

~~6.3.3 The following mixture shall be used for the biofilter swale:~~

Botanical Name	%Purity/ %Germination	Seed Application Rate/Hectare	Container Spacing and Size/Type	Plant Container
Bromus carinatus	95/80	6.7 kg/ha		
Distichlis spicata			300mm C-C of plugs from cut-up flats	
Deschampsia caespitosa	80/60	3.4 kg/ha		
Hordeum	90/80	5.6 kg/ha		
brachyantherum				
Lupinus Bicolor	98/80	3.4 kg/ha		
Nasella lepida			300mm C-C of groove tubes (50mm deep x 19mm wide)	
Nasella pulchra			300mm C-C of groove tubes (50mm deep x 19mm wide)	

- 6.3.4 *The required ~~seeding and~~sod planting and maintenace for the Biofilter Swale shall be classified as Biofilter Swale BMP. Sod will be provided by the owner. Delivery shall be coordinated and agreed upon prior to commencement of work.*

The contract price paid per square meter for biofilter swale BMP shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the miscellaneous work, excavation, backfill, testing, protection of existing utilities, asphalt concrete and aggregate base removal and replacement including materials protection and replacement of existing surrounding landscaping, final grading, involved in constructing the biofilter swale, complete in place, excluding ditch excavation as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

10-1.40E BIOFILTER STRIP

7. BIOFILTER STRIP UNIT

Biofilter Strip unit shall conform to the folling provisions:

7.1 EXCAVATION AND GRADING

- 7.1.1 Biofilter Strip Excavation and Grading shall conform to the provisions in Section 19 "Earthwork" of the Standard Specifications and these special provisions.
- (1) Materials resulting from excavating biofilter strips shall be disposed of as directed by the Engineer.
 - (2) Care shall be exercised to prevent excavating below the grade for the bottom of the biofilter strip and areas excavated below grade shall be filled with suitable material and thoroughly compacted by the Contractor at the Contractor's expense.

7.2 ~~7.2~~ BIO-FILTER SALTGRASS SOD PLANTING AND MAINTENANCE

7.2.1 Soil Preparation

- A. Roughen soil surface, in areas where soil is compacted, particularly on graded cut surfaces.
- B. Using manual or mechanical methods, thoroughly roughen soil to a depth of two (2) to four (4) inches.
- C. Rake soil surface smooth.

7.2.2 Saltgrass Sod Installation

- A. Prior to installing saltgrass sod from flats, if soil is not moist, water planting area to build moisture reserve in the soil to a depth of three (3) inches.
- B. Carefully remove saltgrass sod from flats so that sod comes out in one piece. Place the sod pieces side by side with a gap of approximately one (1) inch between sod pieces.
- C. Lay sod so that, after allowing for watering and setting, the surface level of each piece of sod is the same as the surrounding sod.
- D. Assure that sod does not dry out before or during planting. Keep roots moist at all times during planting operations.

- E. Fill in gaps between sod pieces with sand to the same level as the soil which the sod was grown. Gently tamp down sand to remove air pockets.
- F. Water saltgrass planting thoroughly, immediately after installation. Backfill any voids with additional sand.
- G. Commence maintenance of all saltgrass plantings immediately upon installation of any portion of the work, continuing up to and through the maintenance period.

7.2.3 Saltgrass Maintenance

- A. Maintain saltgrass in a vigorous, thriving condition by proper watering, weed control, fertilization, cleanup, general care and other necessary operations during the entire period of installation and establishment.
- B. Provide water as necessary to saltgrass plantings during the maintenance period. Determine frequency and amount of water applications by checking soil moisture levels on a regular and frequent basis. Apply water prior to wilting of saltgrass.
- C. Water only when necessary. Apply water in a manner that ensures deep penetration into the soils below the saltgrass root zone. Reduce watering frequency as saltgrass becomes established and during cool weather.
- D. During the first six (6) weeks after planting, use a hose or sprinkler to apply water in a gentle stream so as not to disturb the roots or displace the sand in the gaps between the sod pieces.
- E. After sod is established, the planting may be watered with a water truck if roots or sand are not disturbed and if the water truck can apply water in a manner that precludes runoff.
- F. If instructed, apply fertilizer to saltgrass plantings starting in the early spring and every three (3) months thereafter until saltgrass is well established. Apply a turf fertilizer at one-half the rate recommended by the manufacturer.
- G. Remove weed species as necessary during the maintenance period, before weeds reach twelve (12) inches in height and before ripening of seeds.
- H. Control weeds by pulling out by hand or using tools such as hoes. The stems of hoed plants shall be cut below ground level. The weed plant mass shall be removed from the site and disposed of properly.
- I. Mow saltgrass as needed to maintain desired height, but do not mow less than three (3) inches in heights
- J. At no time shall Contractor apply pesticides or herbicides to any planted areas unless instructed in writing.

SEEDING AND FERTILIZING

- ~~7.2.1 Seeding and Fertilizing shall conform to the provisions in Section 20, "Erosion Control and Highway Planting" of the Standard Specifications and these special provisions.~~
- ~~7.2.2 Planting Materials shall conform to the provisions in Section 20-4.05, "Planting" of the Standard Specifications and these special provisions.~~
- ~~7.3 Materials~~
- ~~7.3.1 Seed shall conform to the provisions in Section 20-2.10, "Seed" of the Standard Specifications. Individual seed species shall be measured and mixed in the presence of the Engineer.~~

~~(1) Seed not required to be labeled under the California Food and Agricultural Code shall be tested for purity and germination by a seed laboratory certified by the Association of Official Seed Analysts, or a seed technologist certified by the Society of Commercial Seed Technologists.~~

~~(2) Seed shall have been tested for purity and germination not more than one year period to application of seed.~~

~~(3) Results from testing seed purity and germination shall be furnished to the Engineer prior to applying seed.~~

7.3.2 ~~Legume Seed. Legume seed shall be pellet inoculated or industrial inoculated.~~

~~(1) Pellet inoculated seed shall be inoculated in accordance with the provisions in Section 20-2.10, "Seed", of the Standard Specifications. Inoculated seed shall have a calcium carbonate coating. Pellet Inoculated seed shall be sown within 90 days after inoculation.~~

~~(2) Industrial inoculated seed shall be inoculated with Rhizobia and coated using an industrial process by a manufacturer whose principal business is seed coating and seed inoculation. Industrial inoculated seed shall be sown within 180 calendar days after inoculation.~~

7.3.3 The following mixture shall be used for the biofilter strip:

Botanical Name	%Purity/ %Germination	Seed Application Rate/Hectare	Container Plant Spacing and Container Size/Type
Bromus carinatus	95/80	6.7 kg/ha	300mm C-C of plugs from cut up flats
Distichlis spicata			
Deschampsia caespitosa	80/60	3.4 kg/ha	
Hordeum brachyantherum	90/80	5.6 kg/ha	300mm C-C of groove tubes (50mm deep x 19mm wide)
Lupinus Bicolor	98/80	3.4 kg/ha	
Nasella lepida			
Nasella pulchra			300mm C-C of groove tubes (50mm deep x 19mm wide)
Trifolium Willdenovii	95/75	4.1 kg/ha	

7.3.4 The required excavation, grading, sod planting and maintenance seeding and planting for the Biofilter Strip shall be classified as Biofilter Strip BMP. Sod will be provided by the owner. Delivery shall be coordinated and agreed upon prior to commencement of work.

The contract price paid per square meter for biofilter strip BMP shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the miscellaneous work, excavation, backfill, testing, protection of existing utilities, asphalt concrete and aggregate base removal and replacement including materials protection and replacement of existing surrounding landscaping, final grading, involved in constructing the biofilter strip, complete in place, excluding ditch excavation, as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

10-1.40F INFILTRATION TRENCH

8. INFILTRATION TRENCH UNIT

Infiltration Trench unit shall conform to the following provisions:

8.1 Infiltration Trench Excavation

8.1.1 Infiltration Trench Excavation shall conform to the provisions in Section 19 "Earthwork" of the Standard Specifications and these special provisions.

- (1) Materials resulting from excavating biofilter strips shall be disposed of as directed by the Engineer.
- (2) Care shall be exercised to prevent excavating below the grade for the bottom of the biofilter strip and areas excavated below grade shall be filled with suitable material and thoroughly compacted by the Contractor at the Contractor's expense.

8.1.2 Filter Media

- (1) Filter media shall be composed of a 150mm sand layer above a 3.5m layer of graded gravel.
- (2) The filter sand shall be concrete sand in conformance with AASHTO M6 standards or equivalent.
- (3) The filter gravel shall be washed gravel in conformance with "Permeable Materials" Standard Specifications Section 68-1.023. The aggregate shall meet the following gradation:

Sieve Size	Percentage Passing
100mm	100%
75mm	50% - 80%
50mm	0% - 20%
37.5mm	0% - 5%

- (4) Filter fabric shall be placed around the entire gravel layer. The filter fabric shall have a minimum of 1m overlap. The filter fabric shall conform to Standard Specification Section 88-1.03 Filter Fabric.

8.1.3 Observation Well

- (1) The Landtec Well Vault (phone numbers 800-LANDTEC) shall be Landtec part numbers 1-74101, 1-74201, 1-74301, 1-74401, 1-47501, and 1-74601.
- (2) Observation well pipe, plate and anchor shall be Type 316 ~~Stainless Steel~~ Stainless Steel, or epoxy coated steel per Sections 75 and 95 of the Standard Specifications.

The contract price paid per unit for sand filter infiltration trench BMP shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the miscellaneous work, excavation, backfill, testing, protection of existing utilities, asphalt concrete and aggregate base removal and replacement including materials protection and replacement of existing surrounding landscaping, ditch / trench excavation, final grading, involved in constructing the infiltration trench, complete in place, as shown on the plans, as specified in these special provisions, and as directed by the Engineer

10-1.40G PRECAST PRETREATMENT VAULT
shall be completed conforming to the following provisions:

1 PRECAST PRETREATMENT VAULT

Precast Pretreatment Vault shall conform to the following provisions:

The Contractor shall submit shop drawings and obtain Engineer's approval prior to installation of the filter unit.

1.1 PRECAST CONCRETE PRETREATMENT VAULT COMPONENTS

1.1.1. Precast Concrete Vault: Shall be provided according to ASTM C858-83.

1.1.2. Vault Joint Sealant: Shall be Con Seal CS-101 or Engineer approved.

1.1.3. Cover: Shall be shall be Type 316 Stainless Steel, or epoxy coated steel per Sections 75 and 95 of the Standard Specifications. cover with recessed lift handle and a locking latch with 9.5 mm pentahead bolts. Pentahead key to be provided for filter doors.

1.1.4. Ladder: Bolt-on ladder shall be shall be Type 316 Stainless Steel, or epoxy coated steel per Sections 75 and 95 of the Standard Specifications.. Pull up ladder extender shall extend a minimum of 600 mm above the top rung of ladder.

1.1.5. 90 Degree Ductile Iron Elbow: The ductile iron elbow pipe shall comply with AWWA C 151.

1.1.6. PVC PIPING: Shall be joined in accordance with ASTM D2564.

1.1.7. Gate Valve: Gate Valve shall be a threaded or ring type PVC valve and shall be able to withstand a cold water working pressure of 500 kPa. Gate valves shall be of the same size as the pipeline which the valve serves, unless otherwise shown on the plans.

1.2 EXECUTION

1.2.1 PRECAST CONCRETE VAULT

(1) Vault floor shall slope 6.35 mm (max.) across the width and slope downstream 25.4 mm per 7.315 m of length. Vault top finish grade shall be even with surrounding finish grade surface unless otherwise noted on plans.

(2) Contractor to grout all inlet and outlet pipes flush with vault interior wall. Contractor to grout interior walls.

(3) Sanded PVC fittings shall be used on all PVC inlet and outlet pipes.

1.2.2 CLEANUP: Remove all excess materials, rocks, roots, or foreign material, leaving the site in a clean, complete condition approved by the Engineer. All PVC and fiberglass filter components shall be free of any foreign materials including concrete and excess sealant.

1.2.3 PVC PIPING: Shall be joined in accordance with ASTM D2564.

1.2.4 RESTORATION: Existing facilities, pavement, and base not to be removed as shown on the plans or specified elsewhere shall be restored to original condition.

The contract price paid per unit for the pretreatment vault shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the miscellaneous work including gate valve construction, excavation, backfill, testing, protection of existing utilities, asphalt concrete and aggregate base removal and replacement, hauling and clean up, and restoration involved in constructing the pretreatment vault, complete in place, as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

10-1.41 MISCELLANEOUS IRON AND STEEL

Trash rack for storm drain, , grate and frame for drainage inlets and manhole frame and covers for manhole structure shall conform to the provisions in Section 75, "Miscellaneous Metal," of the Standard Specifications and these special provisions.

Materials for trash rack, grates, frames, fasteners, plates, bars, and wire fabric, located between the inflow and outflow monitoring systems or where shown on the plans, shall be Type 316 ~~Stainless Steel~~ Stainless Steel, or epoxy coated steel per Sections 75 and 95 of the Standard Specifications.

10-1.42 PAINT TRAFFIC STRIPES AND PAVEMENT MARKINGS

Painting traffic stripes (traffic lines) and pavement markings shall conform to the provisions in Sections 84-1, "General," and 84-3, "Painted Traffic Stripes and Pavement Markings," of the Standard Specifications and these special provisions.

The subparagraphs of the first paragraph in Section 84-3.02, "Materials," of the Standard Specifications are amended to read:

Solvent Borne, Acrylic Copolymer Traffic Line.—White, Yellow and Black
Water Borne, Traffic Line.—White, Yellow and Black

State Specification No.
PT-170-A
8010-20A

The State Specification No. for glass beads in Section 84-3.02, "Materials," of the Standard Specifications is amended to read "8010-004 (Type II)."

At the option of the Contractor, permanent striping tape as specified in "Prequalified and Tested Signing and Delineation Materials" elsewhere in these special provisions, may be placed instead of the painted traffic stripes and pavement markings specified herein. Pavement tape, if used, shall be installed in accordance with the manufacturer's specifications. If pavement tape is placed instead of painted traffic stripes and pavement markings, the pavement tape will be measured and paid for as paint traffic stripe and paint pavement marking of the number of coats designated in the Engineer's Estimate.

Full compensation for paint traffic stripes and pavement markings shall be considered as included in the contract price paid for the various items of work involved and no separate payment will be made therefor.

10-1.43 CHAIN LINK FENCE

Chain link fence shall be 2 meters high and shall conform to the provisions in Section 80, "Fences," of the Standard Specifications.

10-1.44 CHAIN LINK GATES

Chain link gates shall conform to the provisions in Section 80, "Fences," of the Standard Specifications and these special provisions.

Gates shall be installed in existing fences at the locations shown on the plans. Gate installations shall be complete with gate post, latch post, concrete footings, braces, truss rods, and hardware. Gate and latch posts shall be braced to the next existing line post as shown on the plans.

At each gate location, an existing line post shall be removed and the new gate installed so it is centered on the post hole of the removed post. Holes resulting from the removal of line posts shall be backfilled.

Gate mounting and latching hardware shall not contain open-end slots for the fastening bolts.

Chain link fabric for gates shall be of the same mesh size as the existing fence in which the gates are installed.

Openings made in existing fences for installation of gates shall be closed during the working day in which the openings are made and when work is not in progress. Temporary closures shall be made with the existing fence fabric or with additional chain link fabric as directed by the Engineer.

Full compensation for making the openings in existing fences, for temporary closing of the openings (including furnishing additional fence fabric if necessary), and for new posts, footings, hardware, braces, and truss rods shall be considered as included in the contract unit price paid for chain link gates and no additional compensation will be allowed therefor.

SECTION 10-2 HIGHWAY PLANTING AND IRRIGATION SYSTEMS

10-2.01 GENERALThe work performed in connection with highway planting and irrigation systems shall conform to the provisions in Section 20, "Erosion Control and Highway Planting," of the Standard Specifications and these special provisions.

10-2.02 EXISTING HIGHWAY PLANTING/IRRIGATION FACILITIES

In addition to the provisions in Section 20, "Erosion Control and Highway Planting," of the Standard Specifications, the work performed in connection with the various existing highway planting and irrigation system facilities shall conform to the provisions in Section 15, "Existing Highway Facilities," of the Standard Specifications and these special provisions.

Existing irrigation facilities shown on the plans or specified in these special provisions to be removed, relocated or salvaged shall remain in place until their use, as determined by the Engineer, is no longer required.

Existing irrigation facilities that are to remain, or are to be maintained, relocated or salvaged as part of this contract, shall be protected from damage. If the Contractor's operations damage the existing irrigation facilities, the Contractor shall, at the Contractor's expense, repair or replace the damaged facilities as follows:

Repair or replacement of damaged facilities shall be completed within 5 working days of the damage.

Replaced irrigation facilities shall be new, and of equal or better quality than the damaged facility.

Replacement irrigation facilities shall be compatible with the irrigation systems to remain.

After repair or replacement of the facilities is complete, the Contractor shall demonstrate to the Engineer that the repaired or replaced facilities operate properly. When remote control valves are repaired or replaced, the valves shall be tested with the irrigation controller in the automatic mode.

Replacement planting shall conform to the requirements specified under "Preservation of Property" elsewhere in these special provisions.

10-2.0 EXISTING HIGHWAY PLANTING

In addition to the provisions in Section 20 of the Standard Specifications, work performed in connection with existing highway planting shall be in accordance with the provisions in Section 15, "Existing Highway Facilities," of the Standard Specifications and these special provisions.

Replacement planting shall conform to the requirements specified under "Preservation of Property" elsewhere in these special provisions.

10-2.02A MAINTAIN EXISTING PLANTS

Existing plants as shown on the plans shall be maintained throughout the life of the contract in accordance with these special provisions.

Existing plants shall be watered as provided in Section 20-4.06, "Watering," of the Standard Specifications.

After initial deficiencies have been corrected as directed by the Engineer, the Contractor shall continue to maintain existing plants and the work shall include but not be limited to the following:

Trash, debris and weeds shall be removed from existing planting areas. Weeds shall be killed prior to removal. Trash, debris and weed removal in ground cover areas shall extend beyond the outer limits of ground cover areas to the adjacent edges of paving, fences and proposed plants and planting areas, and 2-m diameter area centered at each existing tree and shrub outside of existing ground cover areas.

Existing plant basins shall be kept well formed and free of silt. If existing plant basins require repairs, and the plant basins contain mulch, the mulch shall be replaced after the plant basins have been repaired.

When a portion of a new automatic irrigation system is completed, the existing plants to be watered by that portion of the irrigation system shall be watered automatically.

Pesticides for maintaining existing plants shall conform to the provisions in "Pesticides" Section 20-4.026 of the Standard Specifications.

If after completion of the initial inspection and correction of deficiencies, the Engineer determines that existing plants show signs of failure to grow, or are so injured or damaged as to render the plants unsuitable for the purpose intended, the existing plants shall be replaced. Removal, disposal and replacement of the existing plants, shall be in accordance with the requirements specified under "Preservation of Property" elsewhere in these special provisions.

Full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in maintaining existing plants, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer shall be considered as included in the contract prices paid for the various items of work involved and no additional compensation will be allowed therefor.

10-2.02B MAINTAIN EXISTING IRRIGATION FACILITIES

All existing irrigation facilities, shown on the plans or encountered in the field, shall be maintained by the Contractor throughout the life of the contract. Prior to the start of maintaining existing irrigation facilities work, the facilities shall be checked for proper operation, and repaired as specified under "Check and Test Existing Irrigation Facilities" elsewhere in these special provisions.

After the existing facilities have been checked and repaired, the Contractor shall be responsible for the routine maintenance and restoration of existing irrigation systems. The work shall include, but not be limited to, checking irrigations systems for proper operation and adjusting, repairing or replacing valves, valve boxes, sprinklers, risers, swing joints, wye strainers, valve assembly units, and filter assembly units.

The Contractor will not be responsible for maintaining existing water meters, underground pipe supply lines, control and neutral conductors and electrical conduits. Except as otherwise specified under "Existing Highway Irrigation Facilities" elsewhere in these special provisions, repair work to these facilities ordered by the Engineer will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications. Existing automatic irrigation systems shall be operated automatically during the life of the contract, except manual operation will be allowed for the work during plant replacement, fertilization, weed germination and the repair of irrigation facilities.

Irrigation controllers shall be programmed by the Contractor for seasonal water requirements. During winter seasons irrigation systems shall be operated automatically a minimum of 2 minutes every 2 weeks.

Irrigation systems and facilities shall be checked for proper operation at least once every 30 days. When required, as determined by the Engineer, adjusting, repairing or replacing irrigation facilities shall be completed within 5 working days after checking of the irrigation systems. Except as provided elsewhere in these special provisions, repair and replacement of irrigation facilities shall conform to the requirements specified under "Existing Highway Irrigation Facilities" elsewhere in these special provisions

Except as provided elsewhere in these special provisions, full compensation for maintaining existing irrigation facilities, including checking irrigation facilities, shall be considered as included in the contract prices paid for the various items of work involved and no additional compensation will be allowed therefor.

10-2.02C CHECK AND TEST EXISTING IRRIGATION FACILITIES

Existing irrigation facilities that are to remain or be relocated, and that are within areas where clearing and grubbing or earthwork operations are to be performed, shall be checked for missing or damaged components and proper operation prior to performing the operations. Existing irrigation facilities outside of work areas that are affected by the construction work shall also be checked for proper operation.

Full compensation for checking and testing existing irrigation facilities, including testing existing backflow preventers, shall be considered as included in the contract prices paid for the various items of work and no additional compensation will be allowed therefor.

10-3 EROSION CONTROL (TYPE D)

Erosion control (Type D) shall conform to the provisions in Section 20-3, "Erosion Control," of the Standard Specifications and these special provisions.

Erosion control (Type D) work shall consist of applying erosion control materials to embankment and excavation slopes 1:4 (vertical:horizontal) or steeper, and other areas designated by the Engineer. Erosion control (Type D) shall be applied during November 15 and ending January 31 or, if the slope on which the erosion control is to be placed is finished during the winter season as specified in "Water Pollution Control" elsewhere in these special provisions the erosion control shall be applied immediately; or, if the slope on which the erosion control is to be placed is finished outside both specified periods and the contract work will be completed before November 15, the erosion control shall be applied as a last item of work.

Prior to installing erosion control materials, soil surface preparation shall conform to the provisions in Section 19-2.05, "Slopes," of the Standard Specifications, except that rills and gullies exceeding 50 mm in depth or width shall be leveled. Vegetative growth, temporary erosion control materials and other debris shall be removed from areas to receive erosion control.

MATERIALS.-Materials shall conform to Section 20-2, "Materials," of the Standard Specifications and the following:

SEED.-Seed shall conform to the provisions in Section 20-2.10, "Seed," of the Standard Specifications. Individual seed species shall be measured and mixed in the presence of the Engineer.

Seed not required to be labeled under the California Food and Agricultural Code shall be tested for purity and germination by a seed laboratory certified by the Association of Official Seed Analysts, or a seed technologist certified by the Society of Commercial Seed Technologists.

Seed shall have been tested for purity and germination not more than one year prior to application of seed.

Results from testing seed for purity and germination shall be furnished to the Engineer prior to applying seed.

LEGUME SEED.-Legume seed shall be pellet-inoculated or industrial-inoculated.

Pellet-inoculated seed shall be inoculated in accordance with the provisions in Section 20-2.10, "Seed," of the Standard Specifications.

Inoculated seed shall have a calcium carbonate coating.

Pellet-inoculated seed shall be sown within 90 days after inoculation.

Industrial-inoculated seed shall be inoculated with Rhizobia and coated using an industrial process by a manufacturer whose principal business is seed coating and seed inoculation.

Industrial-inoculated seed shall be sown within 180 calendar days after inoculation.

Legume seed shall consist of the following:

LEGUME SEED

<u>Botanical Name</u> <u>(Common Name)</u>	<u>Percent</u> <u>Germination</u> <u>(Minimum)</u>	<u>Kilograms pure live</u> <u>seed per hectare</u> <u>(Slope measurement)</u>
<u>Trifolium willdenovii</u> <u>(Tomcat Clover)</u>	<u>85</u>	<u>3.4</u>
<u>Lotus scoparius</u> <u>(Deerweed)</u>	<u>60</u>	<u>3.4</u>
<u>Lupinus bicolor</u> <u>(Miniature Lupine)</u>	<u>80</u>	<u>4.5</u>

NON-LEGUME SEED.-Non-legume seed shall consist of the following:

<u>NON-LEGUME SEED</u>		
<u>Botanical Name (Common Name)</u>	<u>Percent Germination (Minimum)</u>	<u>Kilograms pure live seed per hectare (Slope measurement)</u>
<u>Vulpia microstachys (Zorro Grass)</u>	<u>80</u>	<u>5.6</u>
<u>Hordeum californicum (California Barley)</u>	<u>80</u>	<u>11.25</u>
<u>Hordeum vulgare (Barley)</u>	<u>80</u>	<u>10.1</u>
<u>Eschscholzia californica (California Poppy)</u>	<u>75</u>	<u>2.25</u>
<u>Nassella pulchra (Purple Needlegrass)</u>	<u>60</u>	<u>4.5</u>
<u>Bromus carinatus "Cucamonga" (Brome Grass)</u>	<u>80</u>	<u>2.25</u>
<u>Encelia californica (California Encelia)</u>	<u>60</u>	<u>2.25</u>

Seed shall be delivered to the job site in unopened separate containers with the seed tag attached. Containers without a seed tag will not be accepted.

A sample of approximately 30 g of seed will be taken from each seed container by the Engineer.

COMMERCIAL FERTILIZER.-Commercial fertilizer shall conform to the provisions in Section 20-2.02, "Commercial Fertilizer," of the Standard Specifications and shall have a guaranteed chemical analysis of 16 percent nitrogen, 20 percent phosphoric acid and 0 percent water soluble potash.

.STABILIZING EMULSION .-Stabilizing emulsion shall conform to the provisions in Section 20-2.11, "Stabilizing Emulsion," of the Standard Specifications and these special provisions.

The requirement of an effective life of at least one year for stabilizing emulsion shall not apply.

Stabilizing emulsion shall be in a dry powder form, may be reemulsifiable, and shall be a processed organic adhesive used as a sod binder.

APPLICATION.-Erosion control materials shall be applied in 2 separate applications in the following sequence:

Legume seed shall be applied by a dry method at the rate of 11.3 kg/ha (pure live seed) (slope measurement). Legume seed shall not be applied with hydro-seeding equipment.

The following mixture in the proportions indicated shall be applied with hydro-seeding equipment within 60 minutes after the seed has been added to the mixture:

<u>Material</u>	<u>Kilograms per hectare (Slope measurement)</u>
<u>Fiber</u>	<u>1120</u>
<u>Non-Legume Seed</u>	<u>38.2</u>
<u>Commercial Fertilizer</u>	<u>90</u>
<u>Stabilizing Emulsion</u>	<u>168</u>

The ratio of total water to total stabilizing emulsion in the mixture shall be as recommended by the manufacturer.

Full compensation for erosion control, including furnishing and placing topsoil, straw, commercial fertilizer, seed, fiber, stabilizing emulsion, removing and disposing of rocks and debris, furnishing all labor, tools, equipment,

and incidentals, including applying water, shall be considered as included in the contract prices paid for the various items of work and no additional compensation will be allowed therefor.

10-4.1 HANDRAILING

Handrailing shall conform to the provisions in Section 83-1, "Railings," of the Standard Specifications and these special provisions.1.

Full compensation for handrailing, including furnishing all labor, tools, equipment, and incidentals, and for doing all the work involved in constructing the railings, complete in place, including but not limited to, excavation, backfill and disposal of surplus material, concrete and reinforcement as shown on the plans, shall be considered as included in the contract unit price paid for Best Management Practice Type 1 Sand Filter and no additional compensation will be allowed therefor.

SECTION 10-3. SIGNALS, LIGHTING AND ELECTRICAL SYSTEMS

10-3.01 DESCRIPTION

Installing and modifying electrical systems shall conform to the provisions in Section 86, "Signals, Lighting and Electrical Systems," of the Standard Specifications and these special provisions.

Electrical work is to be performed at the following locations:

- (1) Escondido Maintenance Station
- (2) La Costa Ave Park and Ride
- (3) Carlsbad Maintenance Station

10-3.02 CONDUIT

Conduit to be installed underground shall be Type 1 or Type 3 unless otherwise specified. The conduit in a foundation and between a foundation or the nearest pull box shall be Type 1.

Conduit sizes shown on the plans and specified in the Standard Specifications and these special provisions are referenced to metallic type conduit. When rigid non-metallic conduit is required or allowed, the nominal equivalent industry size shall be used as shown in the following table:

Size Designation for Metallic Type Conduit	Equivalent Size for Rigid Non-metallic Conduit
21	20
27	25
41	40
53	50
63	65
78	75
103	100

When Type 3 conduit is placed in a trench (not in pavement or under portland cement concrete sidewalk), after the bedding material is placed and the conduit is installed, the trench shall be backfilled with commercial quality concrete, containing not less than 250 kg of portland cement per cubic meter, to not less than 100 mm above the conduit before additional backfill material is placed.

Conduit runs shown on the plans to be located behind curbs may be installed in the street, within 0.9-m of, and parallel to the face of the curb, by the "Trenching in Pavement Method" described in Section 86-2.05C, "Installation," of the Standard Specifications. Pull boxes shall be located behind the curb or at the locations shown on the plans.

After conductors have been installed, the ends of conduits terminating in pull boxes, shall be sealed with an approved type of sealing compound.

At locations where conduit is required to be installed under pavement and existing underground facilities require special precautions, as described in "Obstructions" of these special provisions, conduit shall be placed by the "Trenching in Pavement Method" as specified in Section 86-2.05C, "Installation," of the Standard Specifications.

At other locations where conduit is required to be installed under pavement and if delay to any vehicle will not exceed 5 minutes, conduit may be installed by the "Trenching in Pavement Method."

NEW**Protect underground steel conduit including elbows by providing and by applying the following coating method or an approved equivalent:

(1). Conway coating No. 6F factory applied wrapping. Provide Johns - Manville "Dura tape" or equivalent "Tape coat" or "Proteto wrap" for making connections. Wrap tape with 50 percent overlap. Clean joints with non-oily solvent and apply asphalt vase primer prior to installation of tape.

(2) Conway coating No. 23 factory applied wrapping. Provide Johns-Manville VID-10 or Scotch Wrap No 50 for making connections. Wrap tape with 50 percent overlap. Clear joints by John-Manville No. 22 primer prior to installation of tape.

(3) Republic steel "Galvite" or Occidental coating "OPCCAL-20", minimum thickness polyvinyl chloride coating factory fused steel conduit. Provide fittings having 40 mil minimum thick polyvinyl chloride coating extending as sleeve not less than one pipe diameter (41 mm maximum) beyond each end of the fittings.

Coating is not required for exposed steel conduits extending from the concrete slabs. In concrete slab or grade, earth may be trenched and conduit encased with a minimum of 76 mm of supplemental non-structural concrete.

Prior to backfill test all coating on the steel conduit at job site for repair, imperfections, holidays and pinholes utilizing a jump-spark detector.

Use steel conduit to extend non-metallic underground conduit above grade. Extend concrete duct encasement not less than 305 mm beyond transition from non-metallic to steel conduit. Equip non-metallic underground conduit with bell ends when terminating at underground pull boxes.

10-3.03 PULL BOXES

Grout shall be placed in bottom of pull boxes.

10-3.04 CONDUCTORS AND WIRING

Splices shall be insulated by "Method B".

In addition to the requirements for splices in detector circuits, the open end of cable jackets or tubing shall be sealed in a manner similar to the splicing requirements to prevent the entrance of water.

10-3.05 REMOVING, REINSTALLING OR SALVAGING ELECTRICAL EQUIPMENT

Salvaged electrical materials shall be stockpiled at a location designated by the Engineer within a 20 mile radius of the project site.

The Contractor shall provide equipment, as necessary, to safely unload and stockpile the material. A minimum of 2 working days' notice shall be given prior to delivery.

10-3.06 COST BREAK-DOWN

The Contractor shall furnish to the Engineer a cost break-down for each contract lump sum item of work described in this Section 10-3.

The Contractor shall determine the quantities required to complete the work shown on the plans. The quantities and values shall be included in the cost break-down submitted to the Engineer for approval. The Contractor shall be responsible for the accuracy of the quantities and values used in the cost break-down submitted for approval.

No adjustment in compensation will be made in the contract lump sum prices paid for the various electrical work items due to any differences between the quantities shown in the cost break-down furnished by the Contractor and the quantities required to complete the work as shown on the plans and as specified in these special provisions.

The sum of the amounts for the units of work listed in the cost break-down for electrical work shall be equal to the contract lump sum price bid for the work. Overhead, profit, bond premium, temporary construction facilities, plant and other items shall be included in each individual unit listed in the cost break-down; however, costs for traffic control system shall not be included.

The cost break-down shall be submitted to the Engineer for approval within 15 days after the contract has been approved. The cost break-down shall be approved, in writing, by the Engineer before any partial payment for the items of electrical work will be made.

At the Engineer's discretion the approved cost break-down may be used to determine partial payments during the progress of the work and as the basis of calculating the adjustment in compensation for the item or items of electrical work due to changes ordered by the Engineer. When an ordered change increases or decreases the quantities of an approved cost break-down, the adjustment in compensation may be determined at the Engineer's discretion in the same manner specified for increases and decreases in the quantity of a contract item of work in accordance with Section 4-1.03B, "Increased or Decreased Quantities," of the Standard Specifications.

The cost breakdown shall, as a minimum, include the following items:

- foundations - each type
- standards and poles - list by each type
- conduit - list by each size and installation method
- pull boxes - each type
- conductors - each size and type

service equipment enclosures

The contract lump sum price paid for “Electrical Systems” shall include full compensation for furnishing all labor, and incidentals and for doing all the work involved in installing the “Electrical System,” complete in place, as shown on the plans.